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ABSTRACT

Included in this curriculum guide are outdoor and environmental study activities for grades four, five and six. The activities are designed to help children appreciate the beauties of the forest, pond, and field, to have them observe the interdependence of living things in each community, and to see the role each member plays in maintaining an ecological balance in the community. Both classroom and on-site activities and suggestions are provided to better coordinate the learning experiences. Where appropriate each activity defines its objective, materials needed, procedure to follow, and discussion questions. Also included is a list of investigations from the classroom laboratory manual which directly relate to Environmental Center for Our Schools (ECOS) activities for that particular grade level. Facilities at Forest Park, Springfield, Massachusetts are utilized in the ECOS project. This work was prepared under an ESEA Title III contract. (BL)

ED 063151

September, 1971

SPRINGFIELD PUBLIC SCHOOLS
Springfield, Massachusetts

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ENVIRONMENTAL CENTER FOR OUR SCHOOLS

E.C.O.S.

CURRICULUM GUIDE

GRADES 4, 5, 6

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Superintendent of Schools

Thomas J. Donahoe
Deputy Superintendent

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1971

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ENVIRONMENTAL CENTER for our SCHOOLS
E S E A Title 111
195 STATE ST.
SPRINGFIELD, MASS. 01103

SPRINGFIELD PUBLIC SCHOOLS
SPRINGFIELD, MASSACHUSETTS

ENVIRONMENTAL CENTER FOR OUR SCHOOLS (E.C.O.S.)

CURRICULUM FOR GRADES 4, 5, 6

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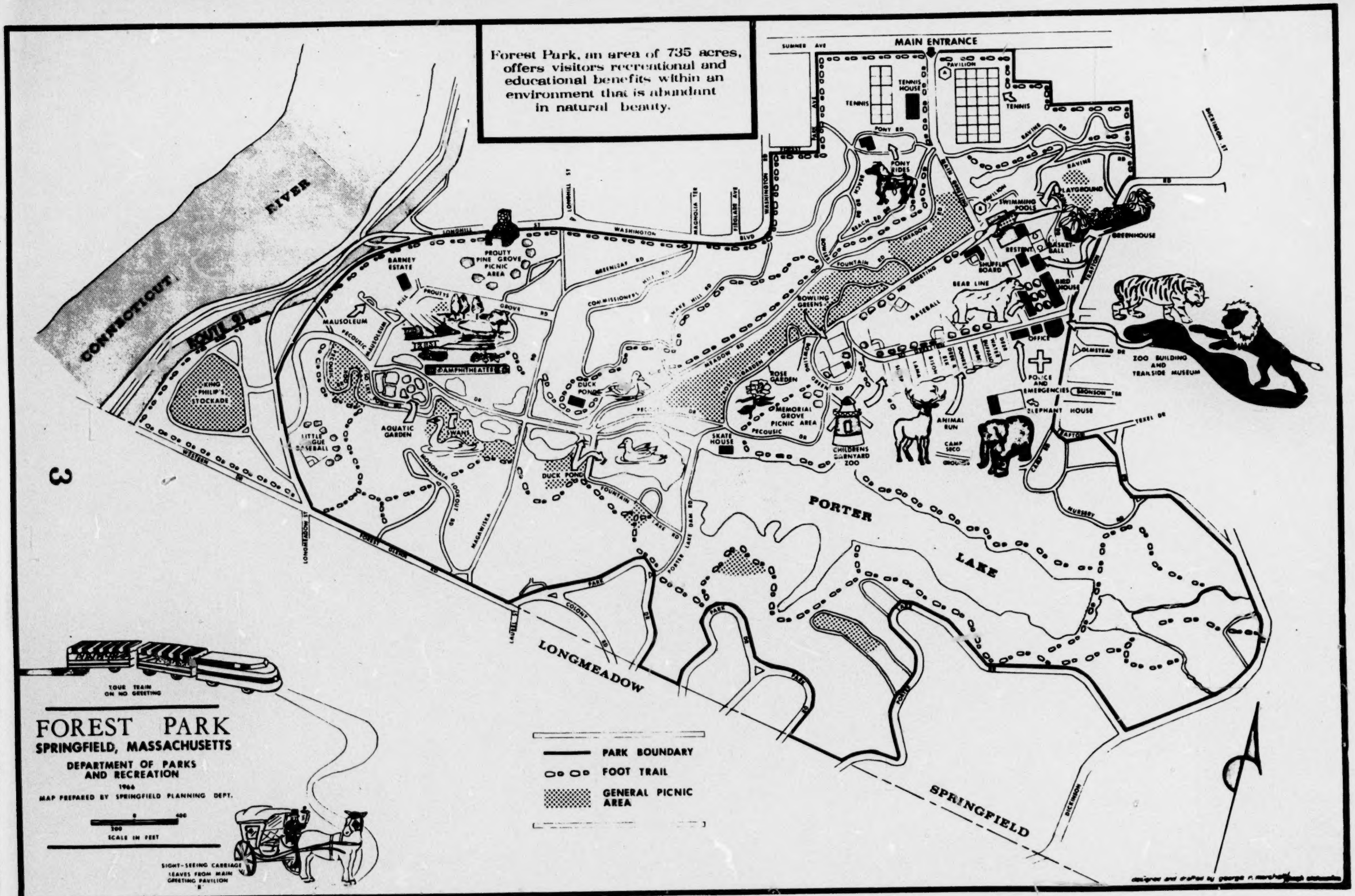
Forest Park, an area of 735 acres, offers visitors recreational and educational benefits within an environment that is abundant in natural beauty.



FOREST PARK

SPRINGFIELD, MASSACHUSETTS

DEPARTMENT OF PARKS AND RECREATION

1966

MAP PREPARED BY SPRINGFIELD PLANNING DEPT.

0 400 800

SCALE IN FEET

E.C.O.S.

GRADE FOUR CURRICULUM MATRIX

9:30 ORIENTATION FOR DAY'S ACTIVITIES - LARGE GROUPS

	DAY 1	DAY 2	DAY 3	DAY 4
MORNING ACTIVITY	SHARPENING THE SENSES 1. sight 2. touch 3. smell 4. sound 5. taste	FIELD COMMUNITY	POND COMMUNITY	FOREST COMMUNITY
		EXPLORATIONS IN EACH COMMUNITY		
			TO IDENTIFY: 1. members 2. needs 3. how needs are met 4. relationships	
		RELATIONSHIP LESSON FOR EACH COMMUNITY (WEB OF ECOLOGY)		
	LUNCH	LUNCH	LUNCH	LUNCH
AFTERNOON ACTIVITY	1. Compass activities 2. Map skills	1. FOLLOW-UP ACTIVITIES OF MORNING EXPLORATIONS 2. Measurement activities	2. Beautiful and ugly	2. Final Evaluations
	SPECIAL ENVIRONMENTAL PROGRAMS TO BE SCHEDULED			

E.C.O.S. GRADE 4 CURRICULUM

INDEX

PAGE	
1.	General Safety Procedures
2.	Discovery Hike
4.	Compass Skills
5.	Introducing Map Skills
6.	Compass and Map Activity
7.	Telling Time with a Compass
8.	Tape Measurement
9.	Introduction to Community Studies
10.	Relationships (Web of Ecology)
12.	Beautiful and Ugly
13.	Field Community
15.	Forest Community
17.	Related Forest Activity "The Big Hike"
19.	Leaf Games
21.	Pond Community

GENERAL SAFETY PROCEDURES

TRAFFIC

1. Single line
2. Walk facing traffic
3. Stop at all intersections
4. Cross only on direction of teacher

INVESTIGATIONS:

1. Students must stay within designated boundaries
2. Students must be in view of teacher at all times
3. Regroup immediately on predetermined signal from teacher
4. Keep shoes or sneakers on at all times

UNLESS DIRECTED OTHERWISE, THE FOLLOWING RULES MUST BE OBSERVED:

1. No running
2. No picking or taking of living things
3. No tasting or eating of living things
4. No tree climbing

DISCOVERY HIKE

MATERIALS NEEDED:

For each student: Discovery Hike Booklets
Pencils

For teacher: Teaching board
Magic Marker

PROCEDURE:

Walk students to the area you've chosen to carry on the discovery activities.

ACTIVITY I:

1. Pass out Discovery Hike Booklets and discuss first activity. Be sure each child understands what he is to do and within what boundaries.

2. Students perform ACTIVITY I independently.

3. Immediately upon signal, the children return to discuss their "finds".

   a. What things did you find that were round? square? rough? smooth? sharp?

   b. What was the easiest to find? the hardest?

   c. From the evidence you've collected, what or who do you suppose has been here before us?

ACTIVITY II:

1. Use same procedure as for ACTIVITY I.

2. Question to extend the concept:

   a. Do you think you'd find this color in the winter? or another season?

   b. Where else in nature might you find these colors?

ACTIVITY III:

1. Use same procedure as for ACTIVITY I.

2. Upon return, use teaching board. Elicit descriptive words for smells from the children. List them on the board.

ACTIVITY IV:

1. Use same procedure as for other activities. Stress that everyone must be absolutely quiet.

2. Suggest that children close their eyes to listen so that their sense of hearing will become sharper.

3. Discuss the sounds heard.

4. How does a forest make you feel? List the words elicited on the teaching board.

DISCOVERY HIKE

1. Go out on your own. Can you bring back

   Something round?

   Something square?

   Something rough?

   Something smooth?

   Something sharp?

REMEMBER NOT TO PICK LIVING THINGS

4. Find a private spot all your own.

   Sit quietly and just listen. write down as many different sounds you can hear in 10 min.

1._____	11._____
2._____	12._____
3._____	13._____
4._____	14._____
5._____	15._____
6._____	16._____
7._____	17._____
8._____	18._____
9._____	19._____
10._____	20._____

2. There are many colors in nature.

   Can you bring back

   Something red?

   Something brown?

   Something green?

   Something yellow?

   Something white?

Time limit: 5 minutes

3. Find something that smells really good. If you can, bring it back. If not, be able to tell about the smell or show the others where it is so they can smell it also.

You have 10 minutes for this mission.

IMPROVISING A COMPASS

A. MATERIALS NEEDED:

wrist - watch

PROCEDURE:

1. Turn the watch until the hour hand points toward the sun.

2. Draw an imaginary line across the watch halfway between the hour hand and 12:00. This imaginary line points North - South.

3. If the watch is set for daylight - saving time, 1:00 is substituted for 12:00.

Note: If there is uncertainty as to which direction is North and which is South, remember that the morning sun is in the eastern part of the sky, while the afternoon sun is in the West. This method works in the North Temperate Zone.

B. MATERIALS NEEDED:

6" stick
a sunny day

PROCEDURE:

1. Insert 6" stick perpendicular to the ground.

2. Mark the tip of the shadow cast by the stick.

3. Several hours later, mark the tip of the new position of the shadow cast.

4. Connect the two marks with a straight line. This is an East - West line.

COMPASS SKILL TEST ACTIVITY

GRADE 4

1. CHOOSE ONE PERSON IN YOUR GROUP TO BE THE PACER.

   WHY MUST THIS PERSON TAKE THE SAME LENGTH STEPS?

2. CHOOSE ONE PERSON TO HOLD THE COMPASS.

3. CHOOSE ONE PERSON TO READ THESE DIRECTIONS.

4. NOW, MARK YOUR STARTING POINT. THEN TAKE.....

   4 PACES N

   4 PACES W

   2 PACES N

   2 PACES E

   1 PACE S

   3 PACES E

   1 PACE N

   1 PACE E

   6 PACES S

   2 PACES W

5. WHERE ARE YOU NOW?

COMPASS SKILLS

MATERIALS NEEDED:

For each student: a magnetic compass
a compass activity sheet

PROCEDURE:

1. Teach the group how to locate North using the compass. Then locate the other directions.

2. Move the group so the children are facing another direction. Locate North again, and East, South, and West.

3. If necessary, repeat #2 until children have learned to use a compass.

4. Pass out compass activity sheet to groups of four children. Students follow directions independently.

5. Check each group's final move to see if they have correctly performed the compass activity.

INTRODUCING MAP SKILLS

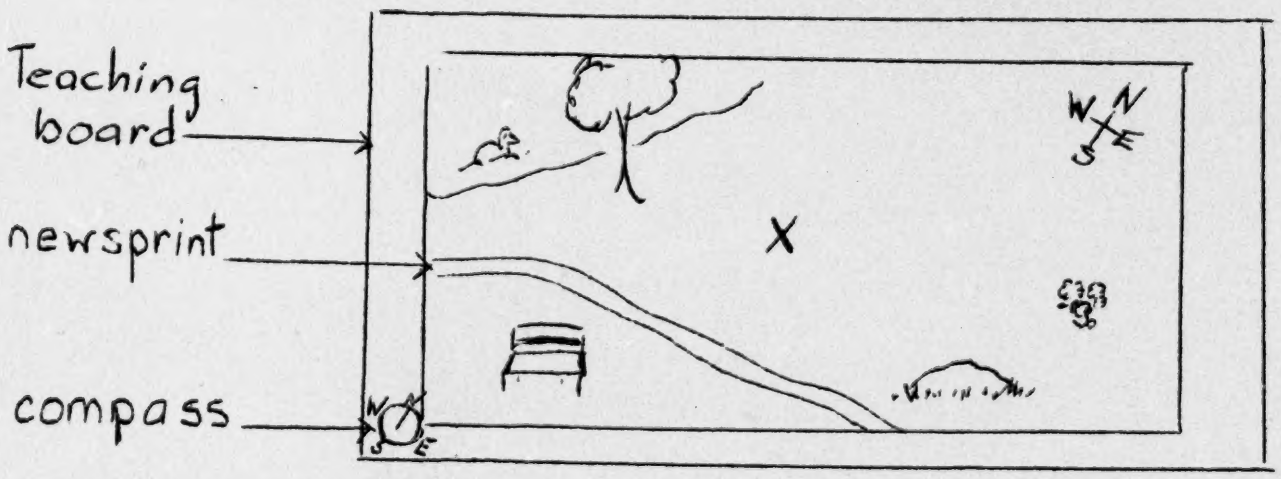
MATERIALS NEEDED:

For teacher: magnetic compass
teaching board
magic markers
colored pencils

PROCEDURE:

1. Seat group in a semi - circle.
2. Place teaching board on flat surface. In one corner, place compass oriented to North.
3. Label directions on newsprint. (See illustration).
4. Have children identify distinguishable landmarks in view: stream, unusual tree, flower patch, dead log, ditch, hill, etc.
5. Draw landmarks on newsprint.
6. Students divide themselves into teams of 2 - 4. Send each team to a different compass direction to locate the landmarks.
7. Upon signal, teams return to report and properly indicate features on newsprint map.
8. Student teams go out independently to use the same procedure in making their own maps.

DIAGRAM:



COMPASS AND MAP ACTIVITY

MATERIALS NEEDED:

For each student: Simple outline map of area
Pencil
Compass

PROCEDURE:

1. Seat children in a circle.
2. Distribute materials and have children locate their positions on the map.
3. Using the compass, have children locate and indicate the directions on the map.
4. Walk the group and have them trace their path on the map, indicating at least eight landmarks or points of interest along the way.
5. Question the group periodically as to what direction they are walking. Use compasses.

ENRICHMENT ACTIVITY (map skills & measuring skills)

1. Have children count the number of paces they take from one point to another = (short distance). Work in pairs.
2. Give one tape measure to two children.
3. Have team (pacer) walk ten paces and measure total distance: Divide by 10 = average pace.
4. Multiply average pace by the total number of parts taken in step #1.
5. All final totals should be the same or approximately the same.

DIAGRAM:

TELLING TIME WITH A COMPASS

MATERIALS NEEDED:

For each student: a magnetic compass
(12 students needed) a sunny day

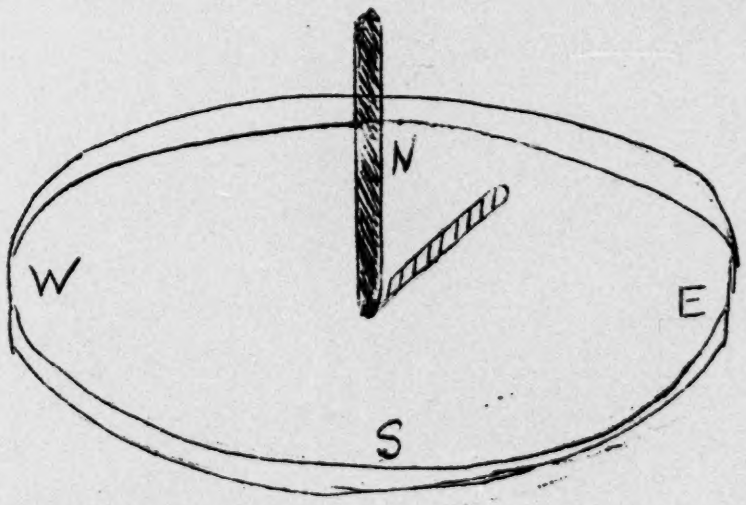
PROCEDURE:

1. Children form a circle with one child in the center.
2. Using compasses, locate North.
3. The student in the circle standing at North represents 12:00.
4. Continue locating East (3:00), South (6:00), West (9:00). Place the other children so they represent the rest of the hours on the clock.
5. The shadow of the student in the center points to the time.

ALTERNATE PLAN FOR SMALL GROUPS:

1. Have the children locate North with their compasses.
2. Hold a twig upright at the center of the compass.
3. Have the compass represent a clock with North being 12:00, East = 3:00, South = 6:00, and West = 9:00.
4. The shadow cast by the twig points to the time.

DIAGRAM:



TAPE MEASUREMENT

MATERIALS NEEDED:

For each student team: tape measure
tape measure activity booklet
pencil

PROCEDURE:

1. Hike students to designated area. Have them divide themselves into teams of two or three.

2. Seat them in a semi - circle. Distribute booklets.

3. Read directions together to be sure all terms are understood.

4. Students do measurement activity independently with leader checking each measurement completed.

5. For teams who finish quickly, give them a special activity such as:

   a. Find something that is exactly the same length as you are.

   b. Find a pine tree that is exactly your age. How tall is it?

TAPE MEASURE GAME

DIRECTIONS: Use your tape measure to find the following. Have your leader check the ones you are able to complete.

1. Two twigs which measured together add up to 16 inches.

   _____ & _____ = 16 inches.

2. A tree whose trunk measures 25 inches around.

   _____

3. Two trees which are 40 inches apart.

   _____

4. Something brown which measures 11 inches.

   _____

5. A tree that has a branch 14 inches long.

   _____

6. Something man - made which measures 1 inches.

   _____

7. A tree whose trunk measures 21 inches around.

   _____

8. A shoe 10" long.

   _____

9. A pine cone which measures 3" around.

   _____

10. Two trees which are 75" apart.

    _____

INTRODUCTION TO COMMUNITY STUDIES

MATERIALS NEEDED:

For students: notebook or paper
pencils

For teacher: teaching board
magic marker

PROCEDURE:

1. Write the word MMYTINUCO on teaching board.

   Can you unscramble this word?
   Clue: it is a word that tells what we'll be studying for the next few days.

   When the word COMMUNITY has been unscrambled, continue with the following questions:

   a. What is a community?

   b. Why do people live together in groups?

   c. How big is a community?

   d. What are the basic needs of the people in your community? (food, clothing, shelter)

   e. What would happen if there were no food?

   f. Why do some communities grow and change?

   g. Has Springfield grown and changed?

2. Begin the investigation of one of the natural communities of pond, field, or forest.

RELATIONSHIPS
(Introduction to Meaning of Ecology)

INTRODUCTION:

What does the word RELATION mean?

T oday we're going to talk about different meanings of the word RELATION.

You have a relationship with your t eacher, your books, your pencil, your desk. In what way are you related to these things?

Depend on teacher for directions and help.
Need desk to write on.
Need pencil to write with.

Relationship in this sense means the connection between one thing and another, or between one thing and many things.

Provide other examples to insure an understanding of this "sense" of the word RELATIONSHIP. Name other objects that are related.

ACTIVITY:

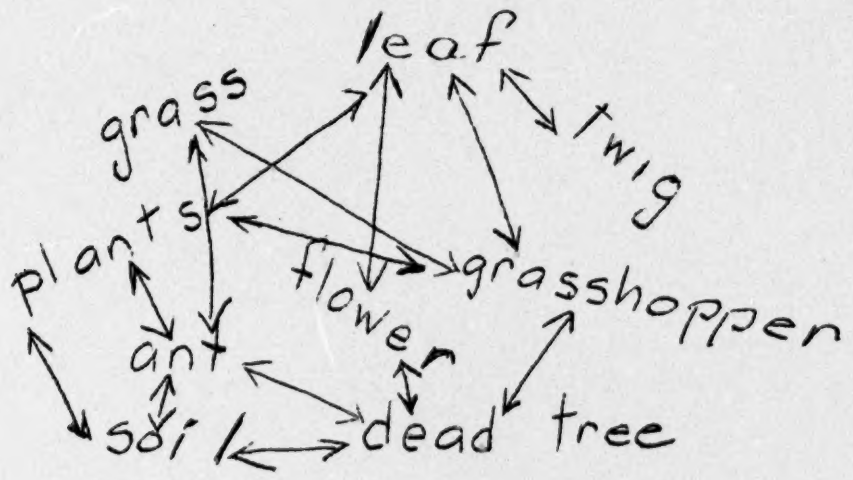
MATERIALS NEEDED:

For teacher: teaching board
magic marker

PROCEDURE:

After a discovery hike in one of the natural communities, list the members of the community that were found. Scatter the words randomly on the teaching board.

DIAGRAM:



Are any of these things related? Draw an arrow between every relationship you can find. Point out how things are related to each other and inter-related as well.

Things in nature form a WEB.

We cannot remove one thing without disturbing others.

We call this relationship ECOLOGY.

BEAUTIFUL AND UGLY
(compass and map skills)

MATERIALS NEEDED:

For each student group: pencil
clipboard with paper
magnetic compass

For teacher: teaching board
magic marker

PROCEDURE:

1. Hike group to special area and seat in circle.

2. Ask students to respond wit h one word descriptions of the word BEAUTIFUL. List these as given on the teaching board. Circle the words the group agrees constitute beautiful.

3. Use the same procedure for the word UGLY. There will be disagreements as to what constitutes ugly or beautiful, but the group will agree on certain elements. Circle these words.

4. Divide children into at least two groups. One group is to find a BEAUTIFUL SPOT within indicated boundaries, the other, an UGLY SPOT. Using the student materials, each group is to draw a map of how to get to their spot.

5. Upon signal, both groups return, exchange maps, and try to locate each other's spots.

FOLLOW - UP DISCUSSION LEAD QUESTIONS:

1. Why was this spot chosen as beautiful or ugly?

2. Were you able to follow the map?

3. Could the map be improved?

4. What other places have you seen in the park that you thought were beautiful or ugly?

FIELD COMMUNITY

MATERIALS NEEDED:

For each student: notebook or paper
pencil
field identity sheet
field worksheet - distribute after activity

For each group: collection jar
field net

For teacher: teaching board
magic marker
Golden Book of Insects and Flowers

PROCEDURE:

1. Hike group to a field.

2. Have group observe the field and discuss the elements that comprise a field (tall grasses, flowers, etc.).

3. Have students divide into groups so each has a field net and collecting jar. Demonstrate how to "sweep" with a net and how to get specimens in collecting jars.

4. Explain the objectives of field lesson are to discover:

   a. The members of a field community

   b. Their needs

   c. How the field meets these needs

   Stress why teamwork is important in this activity Members of field can be listed in notebooks when seen or caught. See who can discover the most members in the given time.

5. Have groups explore the field independently for 30 to 45 minutes or as long as interest is high and time is available.

6. Regroup on signal for sharing discussion. What members of the field community did you collect or see?

7. Use relationship Lesson at this point. (Web of Ecology)

8. Distribute Field Evaluation sheets for children to do.

FOREST COMMUNITY

MATERIALS NEEDED:

For students: notebook or paper
pencils

For teacher: teaching board
magic marker

PROCEDURE:

1. Hike students to a forest study area. Seat in semi - circle:

   a. Why do you suppose I chose this spot for our lesson?

   b. What community do you think we'll be studying today?

2. Discuss how to explore the forest community independently. Stress using all the senses sharply. Have children list in their notebooks all the members they can find in their exploration.

3. Set boundaries for exploration. Allow 10 or 15 minutes.

4. Upon signal, regroup to discuss findings.

5. Develop Relationship Lesson for the forest.

EXTENSION OF CONCEPT:

1. What are the needs of all the members of the forest community?

2. How do they meet their needs here?

3. What would happen if one member could find no food here?
   What would happen to the other members? to the community?
   Does something like this ever really happen? Is it good or bad?
   What could we do to keep this from happening?

ACTIVITY II - LISTENING:

1. Now find yourself a nice private spot - all your own, where you can be comfortable to just sit and listen.

   Try closing your eyes to sharpen your sense of hearing.

   List all the sounds you can hear and identify.

   Allow 10 or 15 minutes for this activity. Stress that absolute quiet is essential.

2. Signak the children to regroup for discussion. List on the teaching board all variety of sounds heard in the forest.

   How does a forest make you feel?

   List expressions of feelings on the teaching board.

RELATED FOREST ACTIVITY

"THE BIG HIKE"

MATERIALS NEEDED:

For each student: Outline map of Porter Lake
Pencil

PROCEDURE:

1. Hike children completely around Porter Lake. Allow 2½ hours minimum. Suggest carrying lunches for picnics along the way.

POINTS OF INTEREST:

1. Tree Nursery: Notice the seedlings, the whips, and the saplings.

   a. Try to identify some of the trees. (maples, oaks, sycamores, flowering crab, and quince)

   b. See if these same trees can be found elsewhere during the "Big Hike".

2. Tree Cemetary or Dump: Good area for discussion:

   a. Do you think this is a good place for the city to dump its dead and diseased trees?

   b. What else could be done with them?

   c. What about the burning restrictions of the state?

   d. What will eventually happen to this ravine and the brooks that feed Porter Lake?

3. Stop at the delta. Discussion suggestions:

   a. Where do you suppose this stream is coming from? (Dickinson St., East Longmeadow)

   b. How has this delta been formed?

c. What kinds of plants are growing in the delta?

d. What will this delta become eventually (a field, and possibly, in time, a forest)

4. Deciduous Forest:

a. Notice the forest floor

b. Take the temperature

c. Do you hear many birds?

5. Evergreen forest: Compare to a Deciduous Forest:

a. Which has more plants growing in it? Why?

b. What are the differences in the forest floors?

c. Which forest is cooler? Why?

After the hike, distribute outline maps for children to indicate landmarks and points of interest. (Reinforces map skills)

LEAF GAMES

I. OBJECTIVE: VISUAL DISCRIMINATION AND LEAF IDENTITY

A. MATERIALS NEEDED:

For the teacher: An assortment of leaves
Teaching board and newsprint

B. PROCEDURE:

1. Hold up one leaf for a few seconds for students to study.

2. Remove the leaf and see who can draw its shape on the teaching board.

3. Continue with other leaves. Stress using the sense of sight sharply. Lessen the time for viewing. Teach the leaf name after the shape has been traced.

II. OBJECTIVE: LEAF IDENTITY

A. MATERIALS NEEDED:

For each student: Leaf identity sheets

For the group: Golden Book of Trees

B. PROCEDURE:

1. Given a specified time and specified area, students try to collect as many different leaves as possible.

SCORE: one point for each different leaf found.

2. Given a specified time and leaf identity sheets, children try to identify as many leaves as possible. Golden Book of Trees can be used for leaves not on identity sheet.

   SCORE: two points for each different leaf named.

3. High scorer is the winner. Can be played as individuals or teams.

III. GROUPING LEAVES - SETS AND SUB - SETS

1. Each child collects as many different kinds of leaves as possible in a specified time and location.

2. He groups his leaf collection any way he wishes, such as size, shape, colors, etc.

3. Children share with each other their reasons for grouping, or they ask others to guess what attributes they used for grouping.

POND COMMUNITY

MATERIALS NEEDED:

For each group: aquatic net
collecting jar
magnifier
mini - aquarium
pond identification booklets

For teacher: teaching board
magic marker
thermometer
Golden Book of Pond Life

For each student: pond test
pencils

PROCEDURE:

1. Organize equipment for hike to aquatic gardens.
2. Show students how to carry aquatic nets. (see diagram)
3. Review Traffic Safety Precautions.
4. At the pond, demonstrate how to use an aquatic net and put specimens in collecting jar.
5. Allow 30 to 40 minutes for children to explore the pond.
6. Upon signal, regroup for discussion.
7. Try to identify some of the members of the pond community that were collected. Use mini - aquarium, pond identification booklets, and Pond Life book.
8. Develop Relationship Lesson for the pond.
9. Return all members collected to their original habitat.

INVESTIGATIONS FROM CLASSROOM LABORATORY
FOUR WHICH DIRECTLY RELATE TO
ECOS ACTIVITIES FOR GRADE 4

INVESTIGATION	TITLE	MANUAL PAGE
17	A Disappearing Drop of Water	58
18	Getting Water from the Air	60
19	Warmed Air	61
20	Purifying Water	62
21	A Way of Collecting Air	64
24	Air Pressure	70
25	The Air We Bfeathe	72
26	Where Green Plants Will Grow	75
27	Life History of a Tree	77
28	Mineral Substances in Soil	79
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36	The Force of Sprouting Seeds	90
37	What Happens When Plants Grow?	91
38	Moving Water	93

Pre - E.C.O.S. activity - grade 4

"FEEL DAY"

MATERIALS NEEDED:

old pillow case or box
various objects such as: scissors, paper clips, stapler, pencil, eraser, and other materials familiar to the children

SUGGESTED PROCEDURE:

1. Discuss the five senses. Stress the importance of touch as a sense. (It is important to show children that increasing the extent to which they use their senses will expand their perceptions and therefore their understanding of the world around them.)

   Observation, which is the basis of understanding, is a lot more meaningful if it involves many of the senses and not just one.

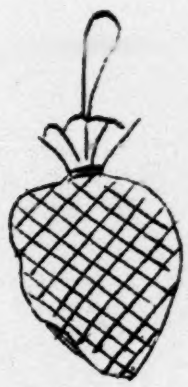
2. Choose a class member to come to the front of the class. Have him reach into the bag or box and, using only his sense of touch, name as many objects as he can. A second child can list items on the board as they are called out. After the "feeler" has finished, empty the bag and check results. Several bags would allow for more pupil involvement.

RELATED E.S.S. UNIT: Attribute Games and Problems

HOME - MADE BIRD FEEDERS

by William A. Tompkins
Interperative Naturalist
at Forest Park

SUET BAG FEEDER



MATERIALS: string
fist - sized piece of suet
string - net bag (onion, orange, or grapefruit bag)

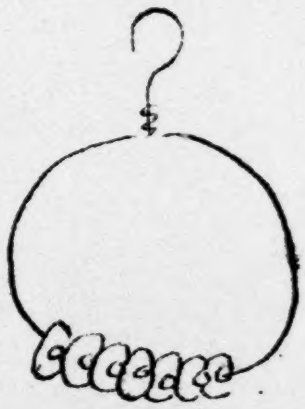
USE: Drop the suet into the bag. Tie off with string just above the suet. Cut off the excess part of the bag. Hang at the end of a branch or some other place that squirrels cannot reach. May attract chickadees, woodpeckers, nuthatches, and brown creepers.

PINE CONE FEEDER

MATERIALS: piece of fine metal wire
pine cone
peanut butter

USE: Wrap the wire around the tip of the pine cone so that it can be hung upside down. The wire should be long enough so that one end can be used as a hanger. Fill the spaces between the scales with peanut butter.

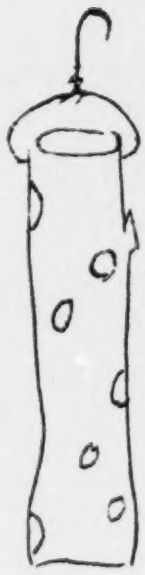
DOUGHNUT FEEDER



MATERIALS: stale doughnuts
silver - colored coat hanger

USE: Form the hanger into a circle. Cut one side of the wire where it joins at the hook. Bend about $\frac{1}{2}$" of this free end back in a "U" so that it can be hooked to the other side. Thread the circle with the doughnuts.

SUET STICK



MATERIALS: Suet
Any small log 2" - 3" thick and 1' - 2' long
Coat hanger

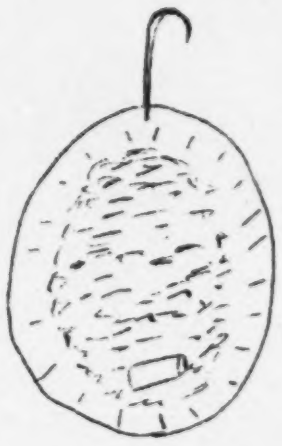
USE: Drill 1" or 1½" wide holes an inch deep into the log. Stuff with suet and hang where woodpeckers and nuthatches can find it.

BOTTLE CAP FEEDER

MATERIALS: small log
bottle caps
nails
peanut butter

USE: Remove the cork from inside several pop bottle caps. Nail them upside down around the log. Fill with peanut butter. Hang.

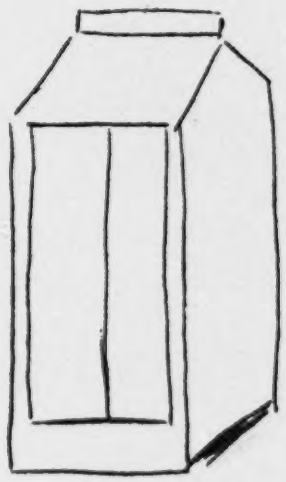
PIE TIN FEEDER



MATERIALS: suet
mixed bird seed
small aluminum pie plate saved after having a frozen meat pie
wire

USE: Mix the bird seed with melted suet and pour this mixture into the pie plate. Before the suet hardens, thrust a small twig or stick into the mixture to supply a perch for the birds. Hang with a piece of wire.

MILK CARTON FEEDER



MATERIALS: empty cardboard milk carton
wild bird seed
wire

USE: Starting about an inch and a half from the bottom, cut out opposite sides of the carton. Fill the bottom with seeds and hang.

PLASTIC JUG FEEDER

MATERIALS: plastic jug (such as for bleach)
scissors or knife
bird seed

USE: Be sure jug is clean. Cut out the sides leaving an edge around the base. Attach a string or wire to the handle for hanging from a tree branch. Fill base with bird seed.

SPRINGFIELD PUBLIC SCHOOLS
Springfield, Massachusetts

Suggested E.C.O.S. Follow-up Activities
Classroom Laboratory 4

Investigation	page in laboratory manual	Purpose	Textbook References
#17 A Disappearing Drop of Water	58	To discover that water in a closed container evaporates and then changes back to a liquid when cooled.	P. 62-65
#18 Getting Water from Air	60	To find that air contains water vapor which may be condensed by cooling.	P. 66-69
#19 Warmed Air	61	To observe that air expands when heated and contracts when cooled.	P. 70-72
#20 Purifying Water	62	To see how settling and filtering help to purify water.	P. 88-92
#26 Where Green Plants Will Grow	75	To discover that plants grow best in a suitable environment.	P. 136-139
#27 Life History of a Tree	77	To determine the life history of a tree by studying its rings	P. 152-156
#28 Mineral Substances in Soil	79	To discover that garden soil contains mineral substances.	P. 140-144
#30 Energy for a Green Plant	82	To find out that plants grow poorly if they do not receive enough light energy.	P. 144-150
#31 Decay of Stale Bread	83	To learn that molds can grow on bread and cause it to decay.	P. 158-162
#32 A Hen's Egg	84	To discover that a hen;s egg provides a proper environment for development of the chick.	P. 197-198
#33 Behavior of a Plant	86	To observe that the root of a plant always grows downward and the stem upward.	P. 202-204
#34 Where Did Sand Come From	88	To investigate the nature of sand by examining its grains.	P. 220-222
#36 The Force of Sprouting Seeds	90	To investigate the force exerted when moist seeds expand and sprout.	P. 230-231
#37 What Happens When Plants Grow	91	To discover that the roots of a plant can exert considerable force.	P. 232
#38 Moving Water	93	To see that the faster water moves, the heavier the particles it can carry	P. 234-237

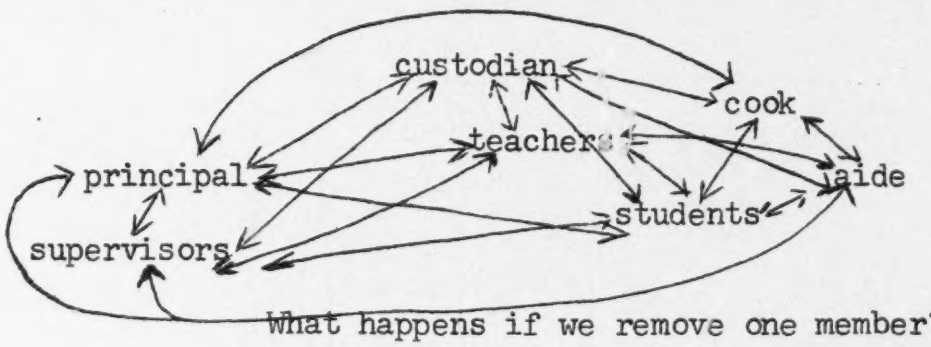
POST - E.C.O.S. ACTIVITY - GRADE FOUR

I. Extension of the community concept to people - a group with needs and interdependencies

A. School is a community

1. Do a "Web of Ecology" for the school.

Who are the members of the school community?



What happens if we remove one member?

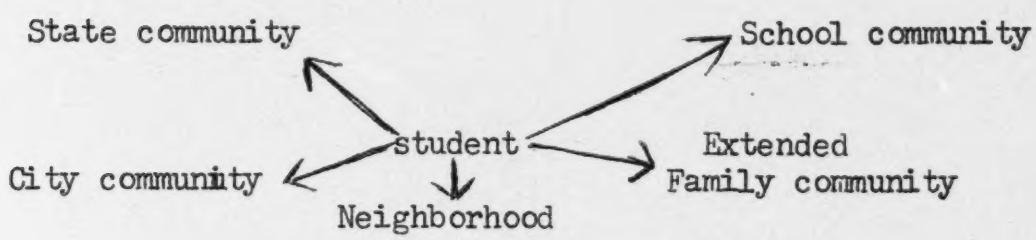
2. Do the same activity for other community groups - church, athletic teams, family, industry.

B. All living things need food, water, and shelter

1. Chart student needs - for example:

2. Each member of the chart also has the same basic needs.

3. In providing for our needs, we are members of various communities:



II. Cycle or chain effect

A. Trace our food chain for various foods such as meat, dairy products, fresh produce, canned goods.

MEAT:

Sun - plants (grass) - cattle - slaughter-house - wholesaler - butcher - housewife - YOU (consumer)

CANNED FOODS:

Sun - plants - cannery - wholesaler - super-market - housewife - YOU

DISCUSSION:

1. What are the waste products of each of the above food chains? (garbage and trash)

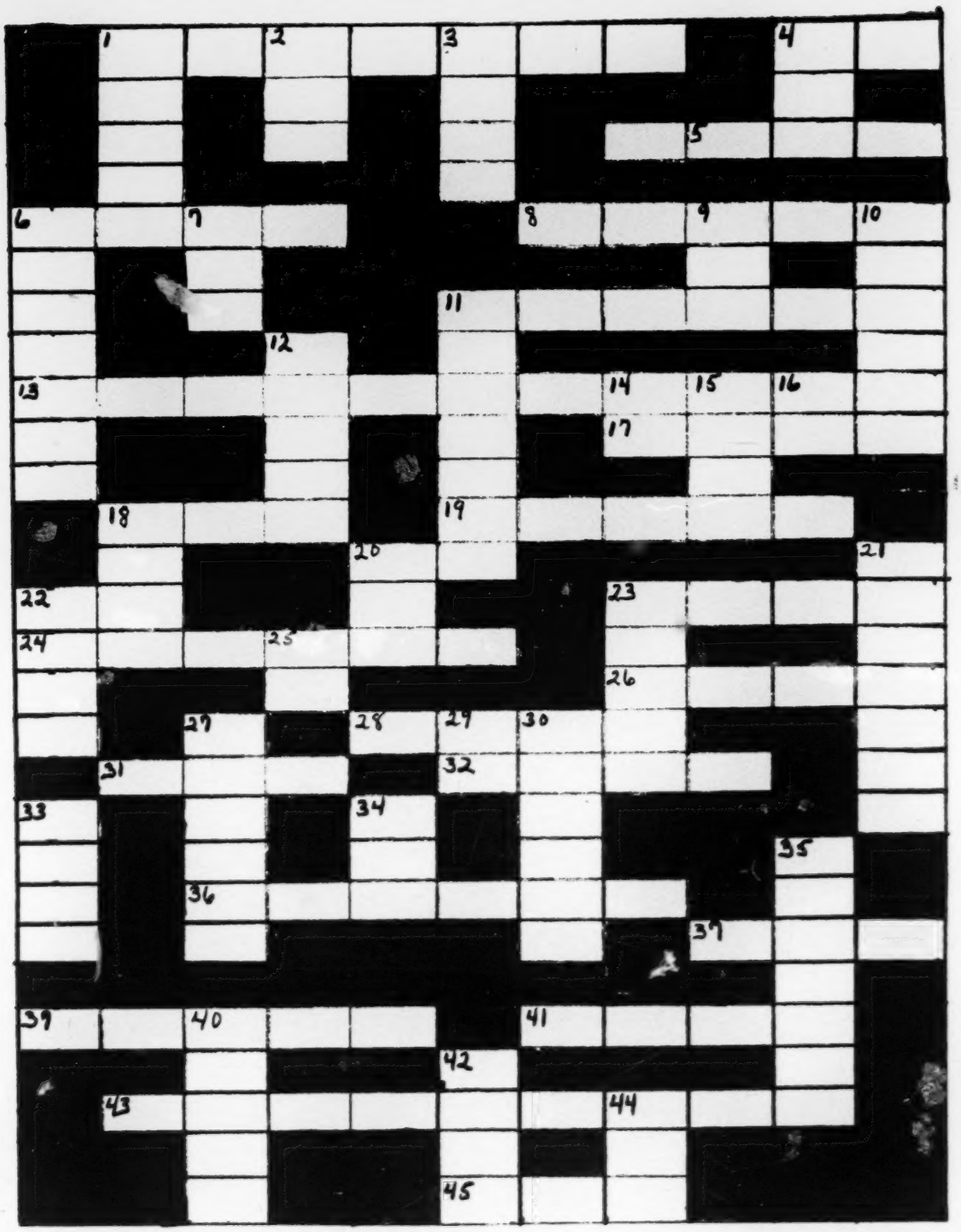
2. How are the wastes handled?

3. What happens to the "wastes" in nature? For example, the dead leaves that fall, or animals and plants that die. (They are recycled. They become part of the environment.)

4. Are Nature's wastes a problem to man?

5. What could man do to his wastes so they would not be a problem? (Recycle)

E.C.O.S. CROSSWORD PUZZLE



E.C.O.S. TITLE III E.S.E.A.

E.C.O.S. CROSSWORD PUZZLE

ACROSS

1. affects the environment
4. abbreviation for morning
5. class of animals with feathers
6. adult tadpole
8. wet, marshy land
11. a water plant
13. one's surroundings
17. your outdoor classroom
18. early leaf or flower
19. most important member of the field community
20. belonging to me
22. male
23. form of water
24. body of land surrounded by water
26. seed container
28. white liquid with lunch
31. relationship
32. home of birds
36. scattered waste
37. frozen water
39. noontime meal
41. Camp _____
43. flying insect
45. not wet

DOWN

1. necessary to life
2. crawling insect
3. land form
4. all around us
6. colorful blossoms
7. tree with acorns
9. air ____ water
10. chlorophyll is present in green
11. study of relationships of living things
12. a type of community
14. this puzzle belongs to _____
15. same as 17 across
16. Should you litter? ___
18. makers of honey
20. human being
21. class of animals with six legs
22. to walk a trail
23. synonym for stones
25. "Where it's ____."
27. all of us
29. opposite of out
30. part of a tree
33. water bird
34. frogs ____ flies
35. shag bark _____
40. compass needle points _____
42. water community
44. damsel ____

E.C.O.S. CROSSWORD PUZZLE

ACROSS

1. WEATHER
4. A.M.
5. BIRD
6. FROG
8. SWAMP
11. ELODEA
13. ENVIRONMENT
17. E.C.O.S.
18. BUD
19. GRASS
20 MY
22. HE
23. RAIN
24. ISLAND
26. CONE
28. MILK
31. WEB
32. NEST
36. LITTER
37. ICE
39. LUNCH
41. SECO
43. DRAGONFLY
45. DRY

DOWN

1. WATER
2. AND
3. HILL
4. AIR
6. FLOWERS
7. OAK
9. AND
10. PLANTS
11. ECOLOGY
12. FIELD
14. HE
15. E.C.O.S.
16. NO
18. BEES
20. MAN
21. INSECTS
22. HIKE
23. ROCKS
25. AT
27. PEOPLE
29. IN
30. LEAVES
33. DUCK
34. EAT
35. HICKORY
40. NORTH
42. POND
44. FLY

E.C.O.S. ANIMAL QUIZ

ANIMAL	MALE	FEMALE	YOUNG	GROUP
ANT				
BEE				
CAT				
CHICKEN				
DUCK				
DEER				
FOX				
HORSE				
RABBIT				
WOLF				

MALES	FEMALES	YOUNG	GROUPS
TOM	QUEEN	PUP	PACK
MALE	HEN	FOAL	SWARM
DOG	BITCH	CUB	DEN
DRONE	DOE	BUNNY	HERD
ROOSTER	MARE	CHICK	FLOCK
BUCK	DUCK	KITTEN	CLUSTER
DOG FOX	VIXEN	DUCKLING	COLONY
STALLION		LARVA	
DRAKE		FAWN	

ANSWERS TO ANIMAL QUIZ

ANIMAL	MALE	FEMALE	YOUNG	GROUP
ANT	MALE	QUEEN	LARVA	COLONY
BEE	DRONE	QUEEN	LARVA	SWARM
CAT	TOM	QUEEN	KITTEN	CLUSTER
CHICKEN	ROOSTER	HEN	CHICK	FLOCK
DUCK	DRAKE	DUCK	DUCKLING	FLOCK
DEER	BUCK	DOE	FAWN	HERD
FOX	DOG	VIXEN	CUB OR PUP	DEN
HORSE	STALLION	MARE	FOAL	HERD
RABBIT	BUCK	DOE	BUNNY	COLONY
WOLF	DOG	BITCH	PUP	PACK

COMMON SEED TRAVELERS

Nature has many ways of scattering seeds far from the parent plant and plant species survive and spread because their seeds fall or are carried to new locations favorable to their growth.

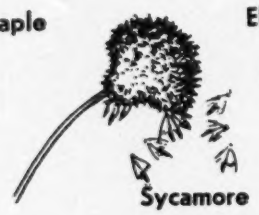
BY WIND

Some seeds have wings,
Some tufts of hair;
A breeze picks them up
And they glide thru the air.

Basswood Ailanthus Ash

Maple

Elm



Sycamore

Clematis Dandelion Milkweed

BY BURS or HOOKS

Seeds with burs
Can "hook" a ride
On your old wool coat
Or an animal's hide.

Burdock

Cocklebur

Tick-trefoil

Agrimony

Beggar's-ticks

Spanish-needles

BY WATER

On rivers and oceans,
Like a tiny boat,
Many seeds travel
If they can float.

Lotus *(½ natural size)*

Coconut *(greatly reduced)*

Arum

Pearlwort

Raindrops splash seeds of tiny pearlwort from their pods.

BY ANIMALS

Birds and squirrels
Distribute the seed
Of fruits and nuts
On which they feed.

Acorn

Hickory Nut

Cherry

Beech Nut

BY MAN

Man plants gardens,
Orchards and fields;
Beauty and riches
The harvest yields.

Bean

Strawberry

Wheat

Corn *(greatly reduced)*

Blackberry

BY EXPULSION

Some seed-pods burst
With a twist or a pop,
And the seeds shoot away
With a jerk and a hop.

Violet Bean Geranium

Oxalis

Jewelweed

Witch-Hazel

Poppy

Wind shakes seeds from poppy seed pods.

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CHART K—One of a series of Nature Charts published by
NATIONAL AUDUBON SOCIETY, 1130 FIFTH AVENUE, NEW YORK 28, N. Y.

Drawings (approximately natural size)
by Helen Duke del. and Virginia Carlson

SET OF 10 ASSORTED CHARTS—50 CENTS

AUDUBON BIRD CALENDAR

Illustrated by ROGER TORY PETERSON

It's fun! Keep a record of the birds you see.
Compare it from year to year.

NAME OF BIRD	DATE FIRST SEEN	Who saw it and what was it doing	Seen in the following habitats (check one)			
			MARSH	MEADOW	FOREST	OTHER

E.C.O.S. WORD GAME

From your experiences at E.C.O.S., you should have many new words in your vocabulary. Circle the letter combinations DOWN, ACROSS, or DIAGONALLY which spell words. There are at least forty words in this puzzle.

B E Z S B W O O D S

E C O L O G Y D C D

E O O H E L P E H R

S S A M L I E L E A

E R K A M W P T S G

E T P P Q U E A T O

D H O L F I N B N N

P I N E A E E I U F

R C D R S L S R T L

E K R T H D T C P Y

D O Y B E E C H I E

A R B O A T M A N A

T Y S F D I X W E R

O S C I L S O W E S

R M U S C L E L D T

M C T H L A A P L U

C E H I O N S O E R

W U W C G D T L S T

W A T E R F A L L L

R E P T I L E U F E

C F F W S U N T E S

A I R O O T B I R D

D N O R T H E O N J

T D G M A I R N S K

GRADE FIVE CURRICULUM MATRIX

CONCEPTS	POND	FIELD	FOREST
SEASONAL CHANGE	Investigating the Winter Pond Invisible Inhabitants	Mapping Seasonal Change	How Trees Modify Climate
SUCCESSION	From Water to Dry Land The Five Stages of Succession	Succession from Field to Forest →	→
ADAPTATION AND MEASUREMENT	Measuring: Ice Thickness Water Temperature Velocity of Stream Volume and Capacity of Stream Testing ph Soil Sampling	Acre Measurement Activity Tracking in the Field Soil Analysis Gall Dwellers	Measuring Tree Growth and Tree Rings Tree Identification Winter Nests

SNOW ACTIVITIES IN ALL COMMUNITIES

E.C.O.S. GRADE FIVE CURRICULUM

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1. Laboratory Investigations which Relate to E.C.O.S. Activities

2. Pre-E.C.O.S. Grade 5 - Classroom Visitation

4. "Log" Sample

5. Classroom Follow - Up

6. Winter Water Environments

7. Investigating the Winter Pond

9. The Invisible Inhabitants (Indoor Activity)

11. From Water to Dry Land

13. The Five Stages of Succession - Worksheet sample

14. Measuring Ice Thickness

15. Measuring Water Temperature

17. Measuring Velocity of a Stream

18. Measuring Volume and Capacity of a Stream

19. Testing ph of Water

20. Investigating Soil-Sampling in a Water Community

21. Winter Field Environments

22. Mapping Seasonal Changes

23. Succession from Field to Forest

24. Tracking in the Field

INDEX (cont.)

PAGE

25. Field Soil Analysis

27. Acre Measurement Activity

28. The Gall Dwellers

30. Winter Forest Environments

31. How Trees Modify Climate

32. Tree Identification

33. Identification Worksheet Sample

34. Tree Growth and Tree Rings

37. Winter Nests

38. Myths and Legends of Trees and Flowers

40. Snow Activities

41. Snow Cover

42. Heat Absorption and Snow

43. Snow Profile

44. Measuring Snowfalls

45. Snow and Air Pollution

46. Snowflakes

GRADE FIVE E.C.O.S. CURRICULUM

I. PRE - E.C.O.S. PROGRAM

A. Laboratory Investigations which Relate to E.C.O.S. Program

B. Classroom Program

C. "Log"

D. On Your Own

II. E.C.O.S. PROGRAM

A. Winter Water Environments

B. Winter Field Environments

C. Winter Forest Environments

D. Snow Activities

III. POST - E.C.O.S. PROGRAM

INVESTIGATIONS FROM CLASSROOM LABORATORY 5 WHICH DIRECTLY RELATE TO E.C.O.S. ACTIVITIES

INVESTIGATION	TITLE	MANUAL PAGE
1.	Expansion of Ice	31
2.	The Lifting Power of Seeds	32
3.	Layers of Sediment	34
4.	Identifying Minerals	35
6.	Minerals in Rocks	40
7.	Sedimentary Rocks	42
8.	Igneous Rocks	44
9.	Metamorphic Rocks	45
14.	Testing Acids and Bases	56
15.	Testing Substances with Litmus Paper	58
16.	Testing for Carbon Dioxide	60
17.	Investigating a Chemical Change	63
18.	Does Air Contain Carbon Dioxide?	65
37.	The Action of Light on a Leaf	106
41.	Temperature Changes in Water and in Air	116

PRE - E.C.O.S. GRADE 5

CLASSROOM VISITATION

I. PRE - TRIP

A. Extend the use of all the senses

1. HEARING:

a. Listen quietly. What sounds do you hear?

b. Are they sounds of nature or man?

2. SIGHT:

a. What things in your neighborhood are natural to the environment?

b. What things are man-made?

3. SMELL:

a. Can you identify any odors in the classroom or odors drifting in from outdoors?

b. Which of these are man-made? natural?

4. TOUCH:

a. Use your fingers as a thermometer. Check the comparative temperatures of various objects in the class - wood, metal, glass.

B. Discuss the "Log" and the purpose of the awareness walk.

II. TRIP

A. Walk around the school neighborhood (thirty minutes maximim) to gather information for "Log". Take notebooks and pencils to record data.

PRE - E.C.O.S. GRADE 5

CLASSROOM VISITATION (cont.)

III. POST -TRIP

A. Complete the "Log".

B. Discussion to lead students to:

make inferences about man's effect on his community
determine what actions might be taken to change the environment
develop an awareness of man's relationship to his environment

IV. FOLLOW - UP

A. Distribute and explain E.C.O.S. On your Own.

B. Encourage all children to do Number four before their visit to E.C.O.S.

V. Give orientation for E.C.O.S. session

Dates scheduled
Proper clothing
Lunches
Busses
Permission slips

School materials needed:
ball point pen or pencil
notebook
Distribution of teacher, parent, and student informational material.

PRE - E.C.O.S. GRADE 5

LOG

Name: _____ Date: _____

1. Man-made things I saw: _____

_____

_____

2. Natural things I saw: _____

_____

_____

3. I think this community (check one)

_____ has very few people.

_____ has just enough people.

_____ has too many people.

4. This community

_____ is open with plenty of light.

_____ is shady with trees.

_____ is crowded with buildings.

5. This community is considered

_____ urban (city), _____ suburban (outskirts)

6. The traffic in this community is

_____ light, _____ medium, _____ heavy

Use the back of your "Log" to answer the following:

7. What are the things <u>you like</u> that man has done to this community?

8. What are the things <u>you don't like</u>?

9. How would you change this community to make it a better place to live?

E.C.O.S. ON YOUR OWN

Other things you can do before your visit to E.C.O.S.

You should all try number four*.

1. Visit other neighborhoods or communities. Fill in a Log for them and compare the information.

2. Make a map of the area covered on your awareness walk. Put in the points of interest.

3. Try to find a picture of your neighborhood taken at least ten years ago.

    a. How has your community changed?

    b. What do you suppose is the reason for the change?

*4. Observe your school yard and neighborhood carefully during the months of September, October, and November before you go to E.C.O.S. Record all the changes you notice. Divide them into Natural Changes and Man-Made Changes. See who uses his senses most keenly to notice the greatest number of changes.

Bring with you to E.C.O.S. the three lists the class feels are the best.

WINTER WATER ENVIRONMENTS

I. SEASONAL CHANGE

A. INVESTIGATING THE WINTER POND

B. THE INVISIBLE INHABITANTS (indoor)

II. SUCCESSION

A. FROM WATER TO DRY LAND

B. WORKSHEET

ACTIVITIES

1. Measuring ice thickness
2. Measuring water temperature
3. Measuring velocity of a stream
4. Measuring volume and capacity of a stream
5. Testing ph of water
6. Investigating soil

INVESTIGATING THE WINTER POND

MATERIALS NEEDED:

For each group of students:

- water net (see procedure for using in Grade 4 Pond Lesson)
- collecting jar

For teacher:

- teaching board
- magic marker
- mini - aquarium
- dipnet
- paper towels

PROBLEM: WHAT THINGS LIVE IN A WINTER POND?

PROCEDURE

1. Review Gr. 4 Pond Lesson. List recalled members of pond community on teaching board.

2. Investigate evidence of life in a winter pond.

   a. Walk the perimeter of the pond. Look for tracks, droppings, fur, feathers, etc.

   b. Record evidences on teaching board

   c. Discuss

3. Students divide into groups of two or three. Distribute student materials for collecting. Record specimens collected on teaching board. Discuss:

   a. Did we find any of the same things we did last year? Why or why not?

   b. Did we find anything new?

c. Is the behavior of animals different in the winter? How?

d. Do you suppose any of the things we have found are in a different life stage of insects than we found before?

4. List on the teaching board the seasonal changes noted by the group that occurred in the winter pond.

THE INVISIBLE INHABITANTS OF A POND
(an indoor activity)

MATERIALS NEEDED:

For teacher:

bioscope
sample of pond water collected earlier by group
heat source for boiling water
film loops
film loop projector

PROCEDURE:

1. Pass sample of pond water around student group.

   a. Can you see any animals in the water?

2. Place sample of water under bioscope for closer examination.

   a. Is there anything living in the water that we couldn't see with the naked eye?

NOTE: MICROSCOPIC ANIMALS AND PLANTS ARE AN IMPORTANT FOOD SOURCE FOR LARGER ANIMALS AND A VITAL LINK IN THE FOOD CHAIN.

3. Show film loops of some of the common microscopic animals - euglena, paramecia, amoeba, volvox- to help identify animals seen in pond water sample.

4. Filter a sample of pond water several times through filter paper.

   a. Are there as many animals present?

   b. Which ones are they?

   c. What happened to the rest?

THE INVISIBLE INHABITANTS OF A POND (cont.)

5. Boil a sample of pond water. Examine under bioscope.

   a. Are there any animals present now? Why?

   b. Would this be a good way to purify water for drinking?

6. Make sketches of microscopic life seen.

SUCCESSION FROM WATER TO LAND

MATERIALS NEEDED:

For each student:

pond succession worksheet
pencil

For teacher:

teaching board
magic marker

PROCEDURE:

INDOOR ACTIVITY:

1. Introduce the concept of succession.

   The earth and all living things are in constant change.
   Discuss how students have changed since the day they were born and will continue to grow and change until the day they die.

2. Distribute worksheets which represent the life of a pond from its early years until it becomes land.

3. The five stages of pond succession are discussed and located on the worksheet.

OUTDOOR ACTIVITY:

1. Hike students to an area in the park that illustrates water to land succession. (Meadow Road is one area, Aquatic Gardens another)
   See if the children can identify the stages of succession using the worksheets as a reference.

SUCCESSION FROM WATER TO LAND (cont.)

DISCUSSION:

1. If water eventually becomes land, what do you suppose land becomes? (probably a forest)

   Have children hypothesize and submit evidence to substantiate their hypotheses.

THE FIVE STAGES OF SUCCESSION

1. OPEN WATER STAGE - only floating microscopic plants and animals (plankton) are found.

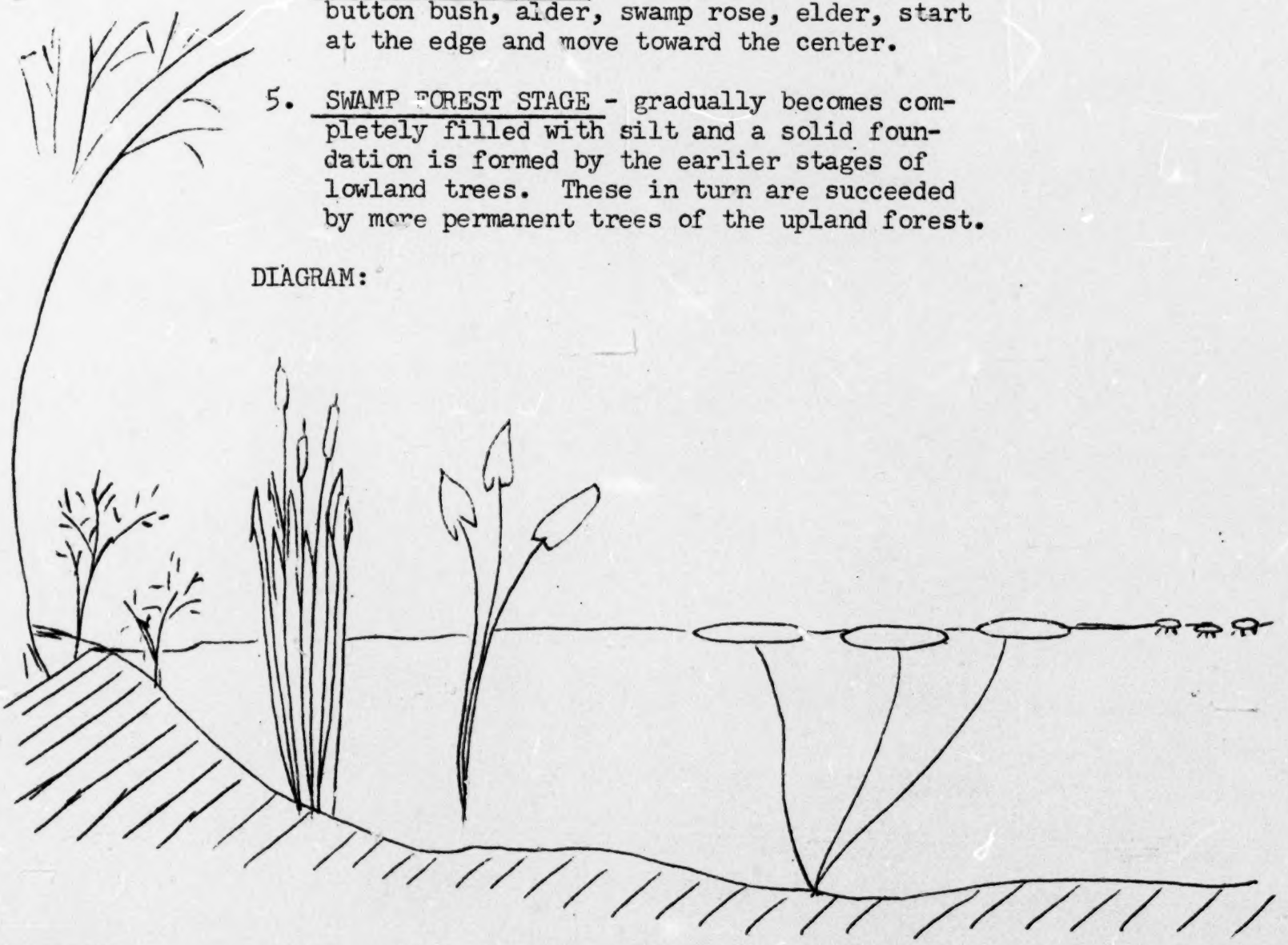
2. FLOATING PLANT STAGE - such floating plants as duckweed, water lily, water hyacinth are present - bogs are of this type.

3. EMERGENT VEGETATION STAGE - plants are rooted in the bottom soil, just along the edges and gradually toward the center, as silt accumulations make the pond more shallow. Such plants as swamp loosestrife, cattails, bullrushes, bur reeds, become established.

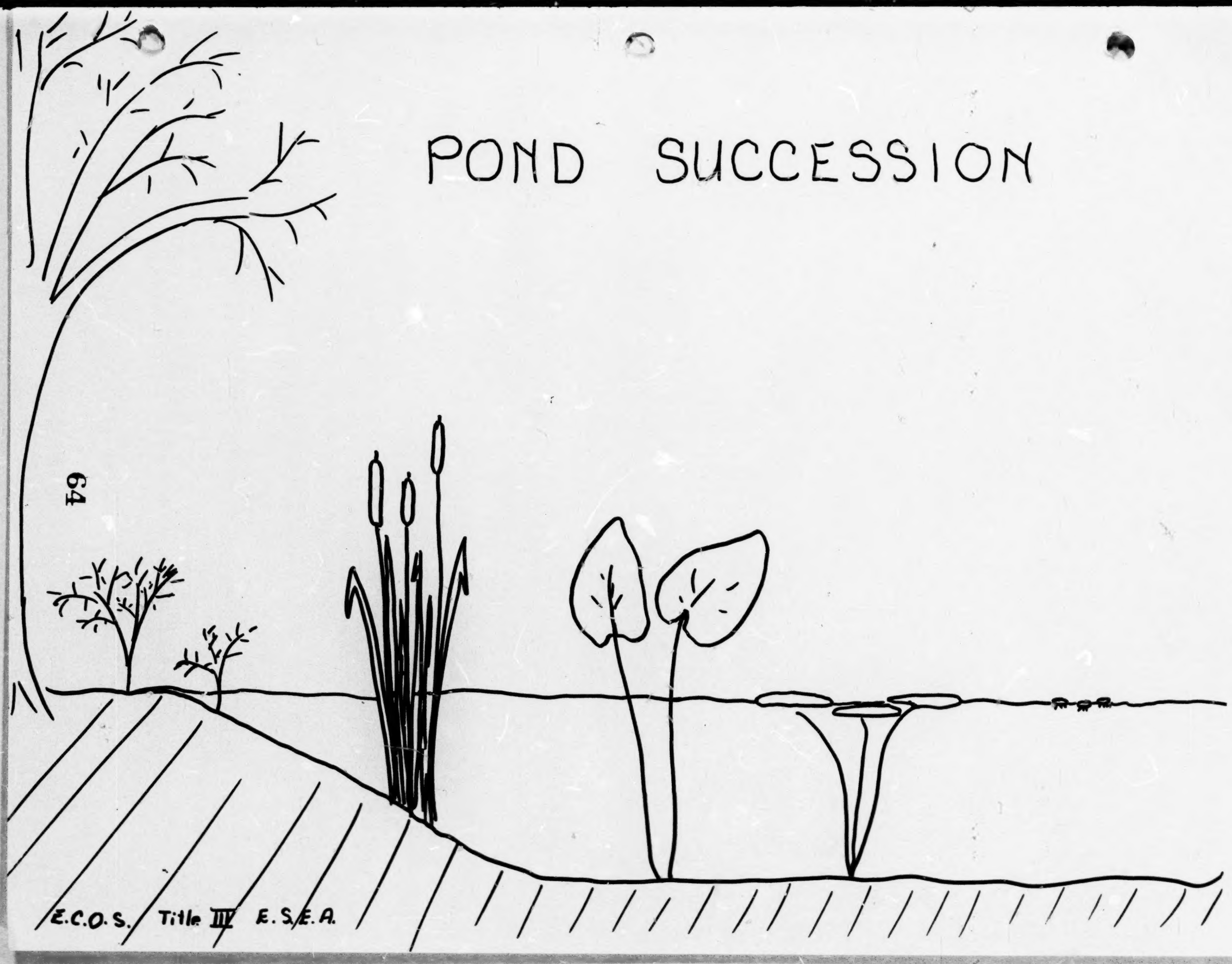
4. SWAMP SHRUB STAGE - gradually such shrubs as button bush, alder, swamp rose, elder, start at the edge and move toward the center.

5. SWAMP FOREST STAGE - gradually becomes completely filled with silt and a solid foundation is formed by the earlier stages of lowland trees. These in turn are succeeded by more permanent trees of the upland forest.

DIAGRAM:



POND SUCCESSION



E.C.O.S. Title III E.S.E.A.

MEASURING ICE THICKNESS

MATERIALS NEEDED:

For each group:

12" ruler or 60" tape measure
ice auger

For teacher:

teaching board
magic marker

PROCEDURE:

1. Each group of two or three students is given an ice auger and ruler.

2. Groups chip holes in ice and measure thickness near the center and near a bank. Measurements are recorded on teaching board. Group determines average thickness.

3. Follow same procedure at other bodies of water, such as aquatic gardens, duck pond, Porter Lake.

DISCUSSION:

1. Why isn't the ice the same thickness everywhere?

2. What is the difference in ice formation on flowing water and still water?

3. Why doesn't the water become ice way down to the bottom?

MEASURING WATER TEMPERATURE

MATERIALS NEEDED:

For each group:

large durable thermometer
drop - line assembly

For teacher:

teaching board
magic marker

PROBLEM: IS ALL NATURAL OUTDOOR WATER THE SAME TEMPERATURE?

PROCEDURE:

1. Distribute materials to each group of two or three students.

2. Students take readings at the different water depth levels - just below the surface, at mid - point, and at the bottom. Air temperature just above the water is also recorded.

3. Temperatures of each group are recorded on teaching board. Students compute averages.

4. Follow same procedure at different bodies of water. Review distinguishing characteristics:

   Pond is shallow.
   Lake has depth.
   Stream has flowing water.

   Temperature readings can be made at different times of day as well as in different bodies of water.

DISCUSSION:

1. Were all the temperatures alike?
2. Is there evidence that water has temperature layers? (the layering effect)
3. Does air temperature affect water temperature?
4. Will the seasons change the water temperature?

MEASURING THE VELOCITY OF A STREAM

MATERIALS NEEDED:

For each student group:

stick
watch
tape measure

For teacher:

teaching board
magic marker

PROCEDURE:

1. Station one child on the river bank.
2. Another child about fifty feet upstream tosses a stick in the water.
3. Record the length of time it takes for the stick to float to where the first child is standing.
4. Compute the velocity with these known facts:

   Velocity = distance travelled divided by length of time.

   $V = D \div T$

DISCUSSION:

1. How does the speed of moving water change the earth's surface.
2. How does the speed of a stream affect the animals living there?
3. Can all water animals live in a fast moving stream? Why not?

MEASURING THE VOLUME AND CAPACITY OF A STREAM

MATERIALS NEEDED:

For each group of 3 or 4 students:

yardstick
50' of string
tape measure

For teacher:

teaching board
magic marker

PROCEDURE:

1. Each group is given a yardstick and tape measure.
2. Group measures width of stream in several places (20 - 50 feet) and finds average width. (A. W.)
3. Group measures depth of stream in several places and finds average depth. (A. D.)
4. Teacher writes the formula Volume = A. W. x A. D. x L (Length) on teaching board and helps group compute the volume of the stream.
5. Teacher asks what "volume" means (section of stream has certain amount of room - 80 square feet, for example). Since stream is not still, it can hold more water over a period of time. This is the capacity of a stream.
6. Teacher writes formula Capacity = Volume x Speed on teaching board. (If speed is not known, do lesson "Measuring the Velocity of a Stream"). Teacher helps group compute velocity of stream.

DISCUSSION:

1. Why is it important to know the amount of water a stream or any body of water holds?
2. Does the amount of water change from season to season?
3. Does the river bed ever change? When?

TESTING ph OF WATER

MATERIALS NEEDED:

For each group of 2 or 3 students:

plastic container

For teacher:

teaching board
magic marker
ph test kit and color chart

PROCEDURE:

1. DISCUSS: differences between acid and alkaline. (Vinegar is acid, soap and ammonia are alkaline). ph factor is a means of telling how acid or alkaline water is by testing water with chemicals. The amount of ph variance determines the animal or plant community a body of water will support.

2. Give each small group a plastic container and hike them to a water source to collect water samples.

3. ph test can be conducted either at the water source, or, if the weather is bad, back at a shelter.

4. Students and teacher discuss surrounding environment (pine needles, oak leaves, etc.)

5. Group follows same procedure in testing three different water sources: pond, stream, and lake or bog.

DISCUSSION:

1. Does the ph factor vary in all these sources?

2. What do you think influences ph in a given area?

3. What is the source of the water?

4. What life does each area support?

5. Is the surrounding plant growth different in each area?

SOIL SAMPLING IN A WATER COMMUNITY

MATERIALS NEEDED:

For each student group: (2 or 3 students)

- plastic container
- large long handled spoon or digging trowel
- notebook
- pencil

For teacher:

- teaching board
- magic marker
- soil samples (clay, gravel, sand, humus)

PROCEDURE:

1. Each student group is given container and spoon.
2. Group is hiked to three different water areas, (pond, stream, swamp, or lake), to get samples of the bottom soil.
3. Students compare soil samples taken with samples supplied by teacher.
4. Students observe and take notes of animal and plant life surrounding each area.

DISCUSSION:

1. Do the soil samples taken from different sources differ? Are they the same?
2. Where do you think the soil comes from?
3. Do you think the bottom of the bodies of water have any affect on the type of plant or animal community it supports?
4. Does it have any affect on the surrounding communities?

WINTER FIELD ENVIRONMENTS

I. SEASONAL CHANGE

A. Mapping Seasonal Change

II. SUCCESSION

A. Succession from Field to Forest

B. Field Succession Chart

ACTIVITIES

1. Tracking in the Field
2. Field Soil Analysis
3. Acre Measurement Activity
4. The Gall Dwellers

FIELD

MAPPING SEASONAL CHANGES

MATERIALS NEEDED:

For each student:

map made by fourth grades
grid map of field
pencil
compass

PROCEDURE:

1. Distribute fourth grade maps. Explain that the map was made by students who were here in the Fall.

2. Select one grid area on the map. Using compass, locate that area in the field.

DISCUSSION:

a. What do you see now that was not there in the Fall?

b. What changes do you see?

c. Why have these changes taken place?

3. Fill in the grid section of your new map based on what you see now.

4. Select the best ones to duplicate for use by other groups.

SUCCESSION FROM FIELD TO FOREST

MATERIALS NEEDED:

For each student:

Field succession sheet

PROCEDURE:

1. Take the group to two fields - a man - maintained field (baseball diamonds), and a natural field. Compare the two.

   a. What kind of plants grow in the man-made field? (grasses)

   b. What kind of plants grow in the natural field? (grasses, weeds, shrubs, small trees)

   c. Why is there more variety of growth in the natural field?

   d. If man does not interfere, what will happen to the natural field over the years? (probably more shrubs and trees will take over to make it a forest) What would happen to the man-made field?

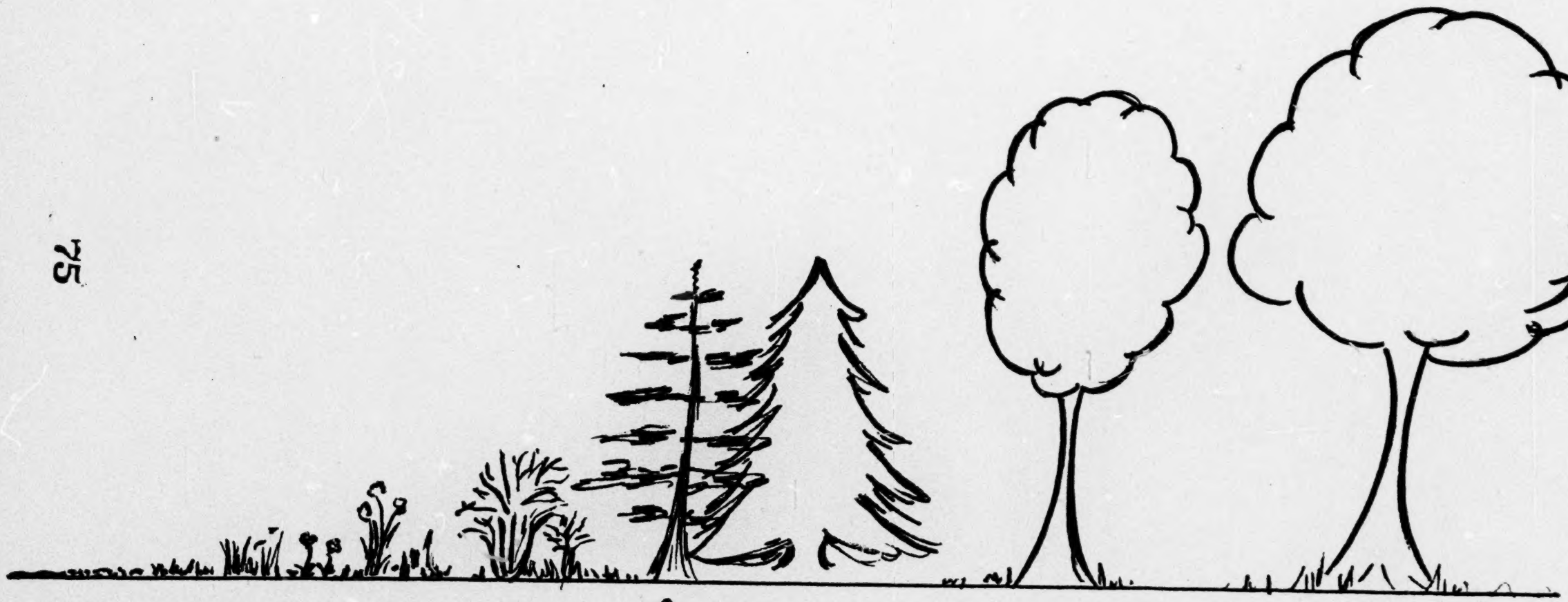
2. Explain succession

   a. We grow and change and so does a field.

   b. This change from one state to another is called succession.

3. Distribute succession charts. Identify level of succession of field visited.

Field to Forest Succession



TRACKING IN THE FIELD

MATERIALS NEEDED:

For each student:

Animal track identification sheet
Tape measure
Pencil
Plaster of Paris (optional)

PROCEDURE:

1. Set out track bait the day before, or look for tracks.

   a. What kind of animal tracks do you see? (birds, mice, squirrel, raccoon, skunk, muskrat)

   b. Are there any man - made tracks?

   c. Do you think we will see any snake tracks?

2. Select a set of tracks and take measurements.

   a. Measure the length, width, and depth of the track.

   b. Measure distance between footprints.

   c. *Take a Plaster of Paris mold.

3. Try to follow a set of tracks. Consider the following:

   a. Why did this animal come to the field?

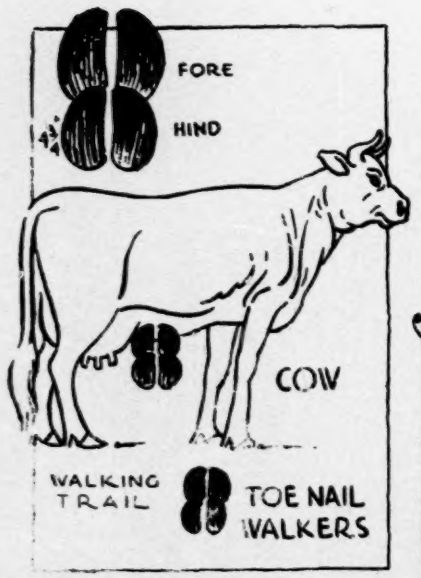
   b. Did he stop anywhere? How often? Why?

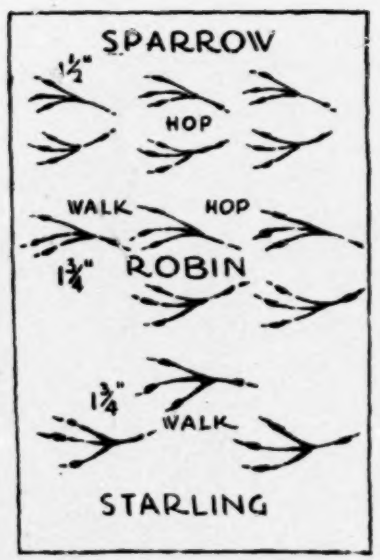
   c. Where do you suppose this animal lives?

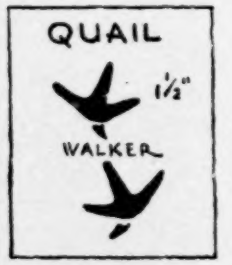
4. Distribute track sheets. Circle tracks that were seen.

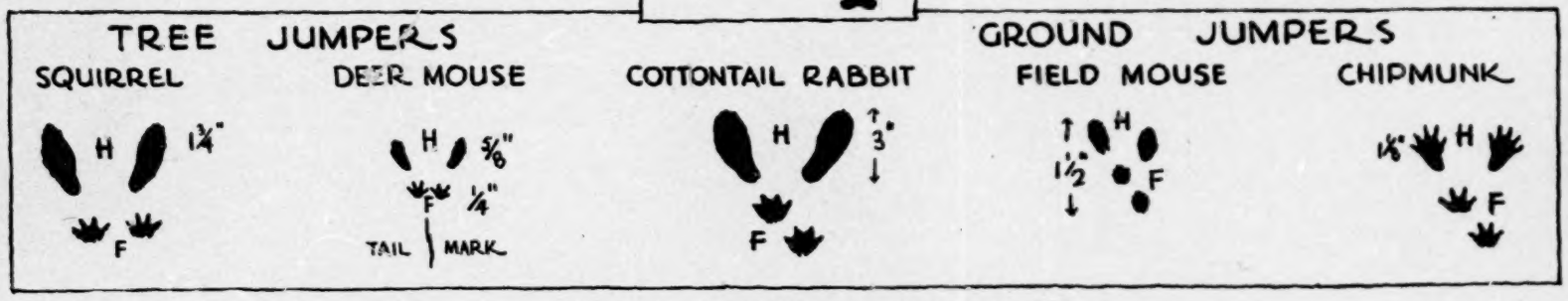
ANIMAL TRACKS

Animal tracks in mud, sand or snow tell stories. Mud tracks are usually the most distinct but snow tracks give the most complete picture of the animal's activities. Toes, hoofs, nails, claws, heels, tails and wings are the principal markers. Both the shape and size of the track are important in recognition. Track patterns too are characteristic. Toes *always* point in the direction the animal was going. Tracks are grouped by method of travel: some always travel on their *toes;* some always travel on their *toe nails;* some walk on their *heels* and *toes;* some hop or jump along (some jumpers, like the squirrel, are climbers; others, like the rabbit, stay on the ground).









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Drawings by Ellsworth Jaeger

SET OF 15 ASSORTED CHARTS 75¢

FIELD SOIL ANALYSIS

MATERIALS NEEDED:

For the group collecting activity - one of each:

measuring tape
digging tool
box large enough to hold a sample of soil
9" x 18"
Golden Book of Insects

For each student group of two - to investigate soil sample:

magnifier
piece of plastic or foil 9" x 18" approximately
teaspoon
collecting cup for animal specimens found
soil analysis worksheet

PROCEDURE:

A. Field Activity:

1. Hike group to a field to collect a soil sample large enough for each two students to have a piece 3" x 6". Have group decide how large the piece must be. (12" x 12")

2. Measure and mark the section of soil to be collected.

3. Collect sample and place in large box to study back under shelter.

B. Indoor Activity:

1. Place 3" x 6" sample on plastic or foil for each two students

2. Distribute teaspoons, collecting cups, magnifiers, tapes and worksheets.

3. Can you find the answers to the questions on your worksheet?

Keep in mind the following:

a. Investigate soil by layers. Place top soil in one pile, bottom soil in another.

b. Study plants first. Look at the roots.

c. Place animals in collecting cups.

4. Further questions for discussion:

a. Are all root systems alike? Which is longer - the stem or the root?

b. Are spiders insects? How many legs do they have?

c. Why do some animals live underground in the winter?

5. Final activity - return soil sample back to the plot.

C. Extension of Activity:

1. Make a soil study of a sample from around your school. Compare the two.

SOIL ANALYSIS WORKSHEET

1. How deep is your piece of soil?

2. Draw a side view of your piece of soil below.

3. What are the differences between the top and bottom parts of the soil sample?

4. How many plants did you find in your sample?

5. How many different kinds of plants did you find?

6. Can you name some of these plants?

7. How many worms and larvae did you find?

_____

8. Where did you find them?

surface_____

top of soil_____

bottom of soil_____

9. How many insects did you find?

_____

10. In what part did you find them?

surface___ top___ bottom____

11. How many members of the spider family did you find?

_____

12. In what part did you find them?

surface___ top___ bottom____

ACRE MEASUREMENT ACTIVITY

MATERIALS NEEDED:

Several tape measures

PROCEDURE:

1. Discuss with student how to best measure off approximately on acre of land (210'x 210')

   a. Measure a student's pace. Figure out how many paces he needs to make 210'.

2. Have the student pacer pace off 210 square feet. Mark each corner.

DISCUSSION:

1. If you were given this acre of land, what would you do with it?

2. How would your changes effect the surrounding areas?

3. Is there enough land to give every child in your school one acre of land? every person in the city? the state? the world?

THE GALL DWELLERS

MATERIALS NEEDED:

For each student:

Gall identification sheet
Collecting bag

For teacher:

Dissecting knife

PROCEDURE:

1. Introductory discussion:

   a. Where do insects live? (soil, dead trees, under rocks, on trees)

   b. Do any have special homes?

   c. What do insects do in the winter? Do you think we can find any out in the field now?

2. Let's go on a search:

   Set boundaries and time limit.

   PROBLEM: Can you find at least one insect or one insect home?

3. Discuss and share findings. (Hopefully, some will come back with galls. Be prepared with a few in case none are found.)

   a. Where did you find the gall? (root, stem, leaf)

   b. How does it feel? (Note its shape, color, size and texture.)

   c. What's inside? Let's open them and find out.

4. Dissect a gall carefully

   a. Is there an insect inside? more than one?

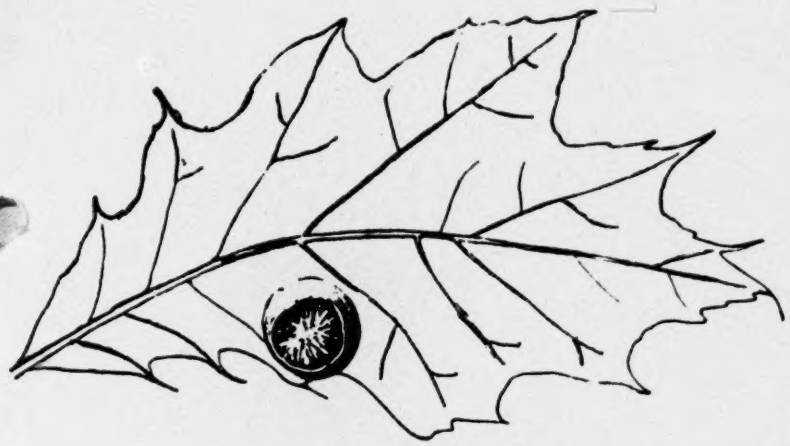
b. Is there a door to this insect house? Are there "rooms"?

c. Is it a good winter home for an insect? Why? (shelter, protection)

d. Are all galls alike?

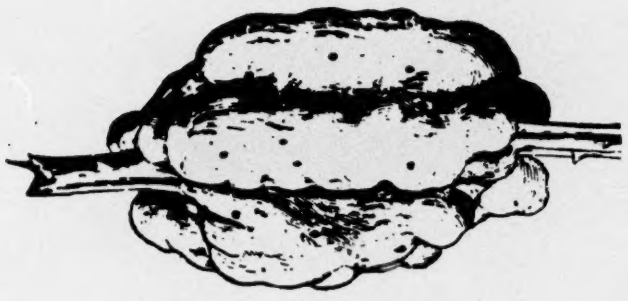
5. Distribute gall identification sheets. Set boundaries and time limit.

PROBLEM: How many kinds of galls can you find?

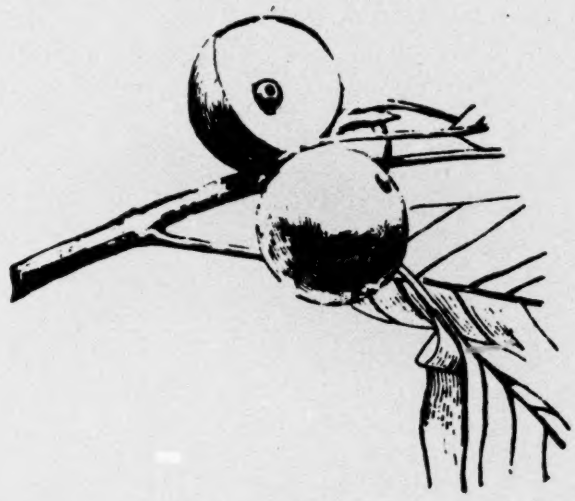


Empty Oak Apple Gall (Wasp)

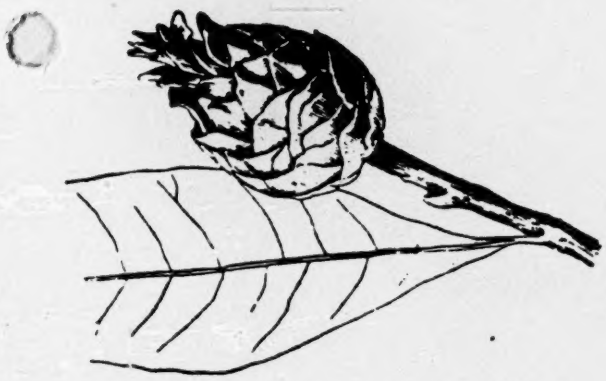
Spongy Oak Apple Gal (Wasp)



Blackberry Knot Gall (Wasp)

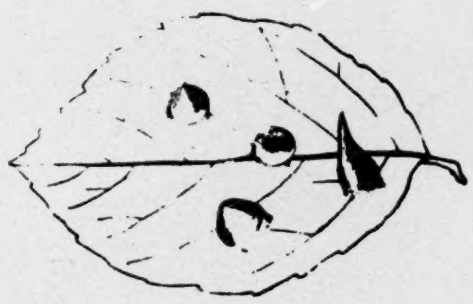


Oak Bullet Gall (Wasp)

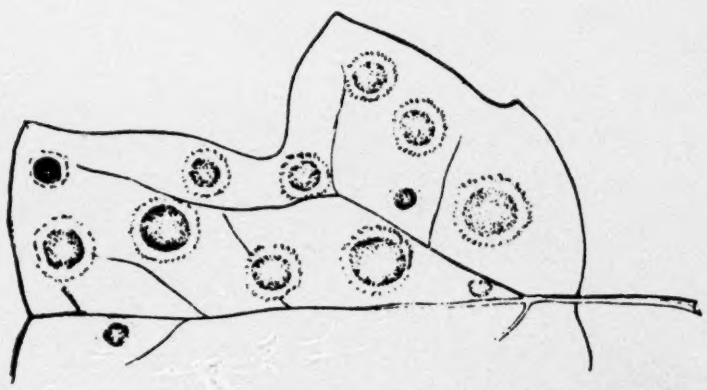


Willow Pine-cone Gall (Fly)

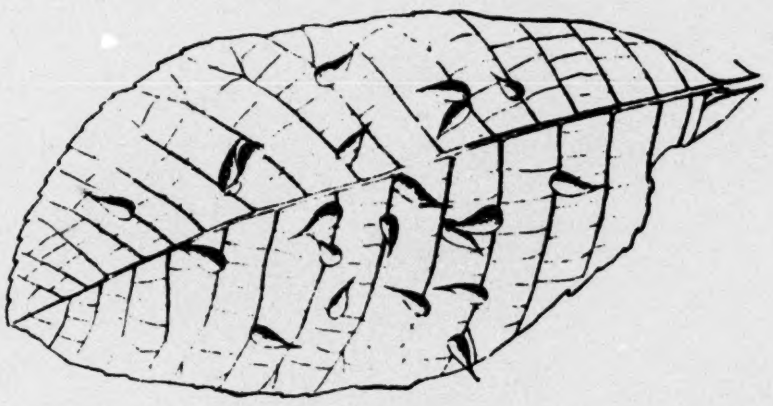
Huckleberry Gall (Wasp)



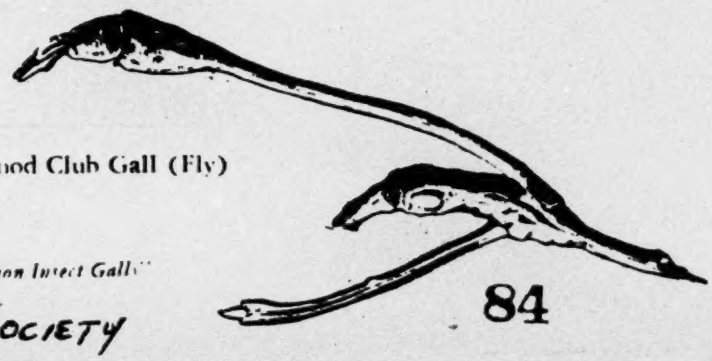
Witch-hazel Cone Gall (Aphid)



Tulip Tree Spot Gall (Fly)



Hickory Seed Gall (Fly)



Dogwood Club Gall (Fly)

Drawings from School Nature League Bulletin "Common Insect Galls"

NATIONAL AUDUBON SOCIETY

HOW TREES MODIFY CLIMATE

MATERIALS NEEDED:

thermometers
pencil and notebook
cobalt paper or hygrometer

PROCEDURE:

Review the use of a thermometer and hygrometer with the students. Students measure temperature and humidity of a tree area at the following levels:

1. Five inches below surface of ground
2. At ground level
3. Five inches above the ground
4. Fifteen to twenty feet above ground (thermometer on a pole)

Have the students compare results to another area that is in the open.

DISCUSSION:

A. How does a tree modify the climate?

B. How is this modification helpful or detrimental to man?

C. How could trees be helpful in your community?

TREE IDENTIFICATION

OBJECTIVE: To help children learn to identify trees using other methods than leaves

MATERIALS NEEDED:

For each student:

tree silhouette identification sheet
leaf scar identification sheet

PROCEDURE:

1. Discuss methods of tree identification used other than leaves.

2. Distribute identification sheets. Make several trial identifications to be sure students understand how to use the sheets.

3. Hike students to identification area. Pair students.

   Note: trees to be identified can be marked with numbers by instructor

4. Each correct identification gets team one point.

DISCUSSION:

1. What method did you use to identify the trees?

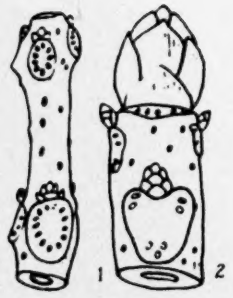
2. Did you think it was easier than leaf identification?

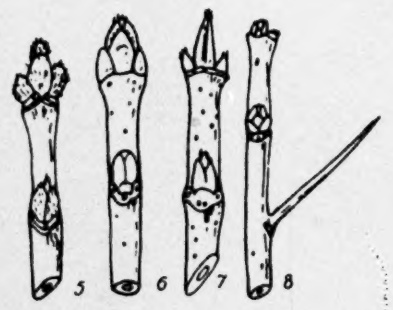
3. Why do we need to know what kind of trees make up an area?

TWIGS OF COMMON TREES

Text and drawings by JOHN W. THOMSON, Professor of Botany, The University of Wisconsin

1. Catalpa**
2. Horse Chestnut*
3. Flowering Dogwood*
4. Black Haw
5. Box Elder*
6. Silver Maple*
7. Red Maple*
8. Hawthorne
9. Poison Sumac
10. Sugar Maple*
11. Norway Maple*
12. Black Ash*
13. White Ash*
14. Green Ash*
15. Red Ash*
16. Honey Locust
17. Black Locust
18. Butternut
19. Black Walnut
20. Tulip Tree
21. Persimmon
22. Hackberry
23. Sour Gum, Tupelo
24. Sassafras
25. Sycamore
26. Willows
27. Black Birch
28. Yellow Birch
29. Paper or Canoe Birch
30. Gray Birch
31. Hop Hornbeam
32. Chestnut
33. Basswood
34. American Hornbeam or Blue-Beech
35. Slippery Elm
36. Rock Elm
37. American Elm
38. Ailanthus
39. Lombardy Poplar
40. Cottonwood
41. Silver Poplar
42. Large-toothed Aspen
43. Quaking Aspen
44. Beech
45. Pin Cherry
46. Wild Black Cherry
47. Choke Cherry
48. Shadbush, Serviceberry
49. Pear
50. Apple
51. Rowan Tree
52. Mountain Ash
53. Bitternut
54. Shagbark Hickory
55. Pignut Hickory
56. Black Oak
57. Scarlet Oak
58. Bur Oak
59. Red Oak
60. White Oak
61. Chestnut Oak
62. Swamp-White Oak





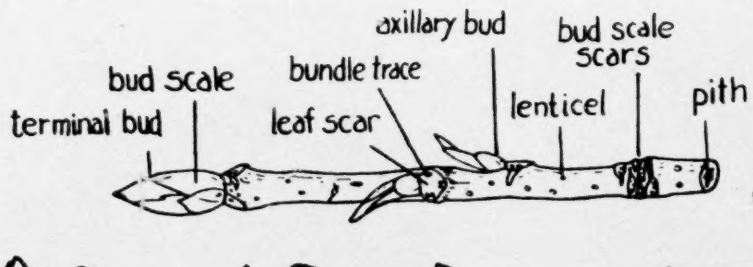
Identify twigs easily by observing:

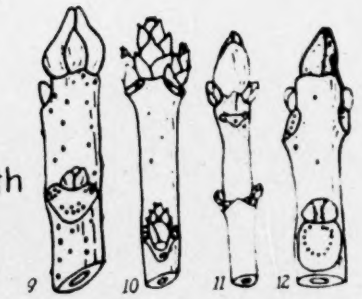
buds – their shape, size, scales

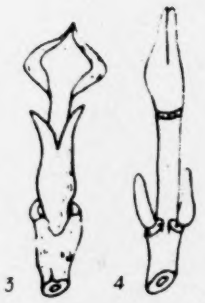
bark – its color, the pattern

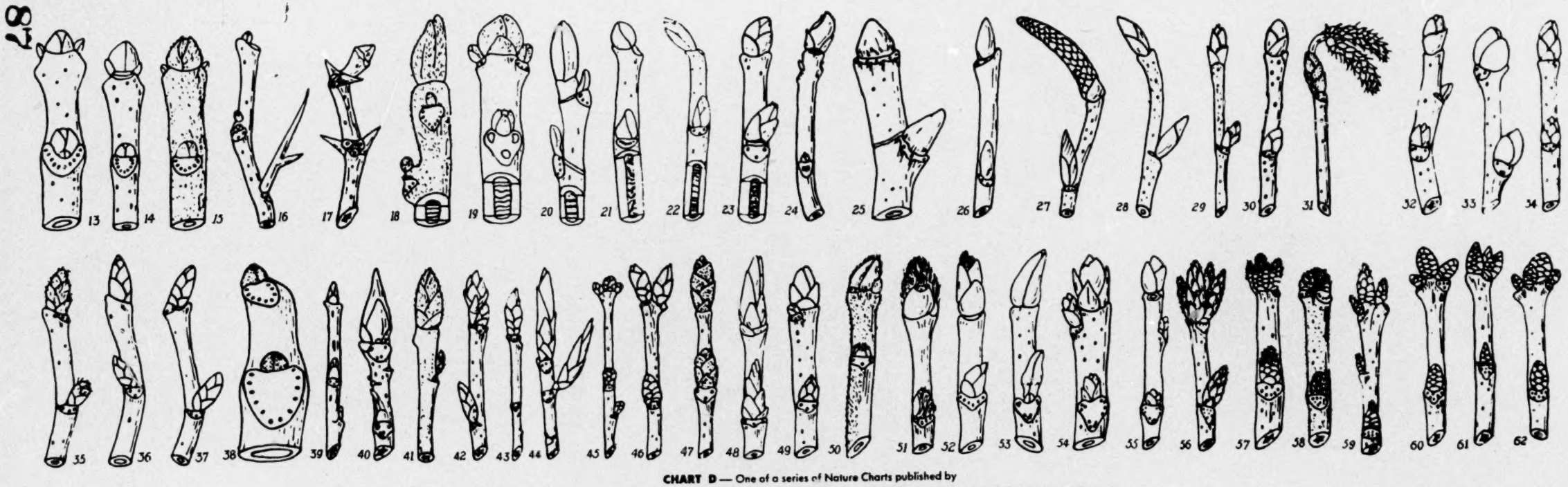
leaf scars – their shape, pattern, if scars are opposite*, in circle of 3**, or alternate

pith – its color, if chambered (e. g. No. 19)









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SET OF 15 ASSORTED CHARTS 75¢

TREE GROWTH AND TREE RINGS

I. METHOD A:

MATERIALS NEEDED:

Tree borer
Pencil and notebook

PROCEDURE:

1. Review the differences between hardwood and softwood trees.

2. Students take a short hike to observe growth of hardwoods and softwoods. Students are asked to note where these types of trees are growing.

3. Wood borings are taken to show the differences in the size of a hardwood and a softwood tree of approximately the same age.

DISCUSSION:

1. How does the growth process of a tree differ from human growth?

2. How does a tree compete to survive?

3. How are some trees better equipped to survive in special environments?

II. METHOD B:

MATERIALS NEEDED:

various soft and hardwood tree trunk sections

PROCEDURE:

1. Review differences between softwoods and hardwoods.

TREE GROWTH AND TREE RINGS (cont.)

2. Have students determine the age and growth sequences of the tree.

3. Compare student's age and growth to the age and size of the tree.

4. Correlate important historical events to tree rings and size. (i.e. World war II)

OTHER INVESTIGATIONS:

1. Find the heartwood, springwood, summerwood, sapwood, cambium layer and bark.

2. What can the rings of a tree tell you?

3. Find the dates of good growing years and bad growing years.

4. Can you tell the topography of the land where the tree grew by the rings?

5. What evidences can you find to show something happened to the tree while it was growing?

TREE MEASUREMENTS

MATERIALS NEEDED:

calipers or slender branch or stick
pencil and notebook
tape measures

PROCEDURE:

A. Determining age of conifer

Each ring of branches from the trunk represents one year's growth.

ACTIVITY: Find a conifer that is your age. Which is taller - you or your tree?

B. Determining tree height

Use the formula below:

$$\frac{\text{Length of Tree shadow} \times \text{Length of stick}}{\text{Length of stick}} = \text{Tree Height}$$

C. Measuring diameter of a tree

1. Break one end of a stick so it bends at right angles to a tree trunk.
2. Break the other end so that it touches the other side of the tree at right angles.
3. Distance between both breaks is diameter.

D. Measuring circumference

Use tape measure to measure the distance around the tree trunk.

WINTER NESTS

MATERIALS NEEDED:

For each student group of two or three:

measuring tape
bird nest investigation sheet

PROCEDURE:

1. Introduction: Today we're going on a treasure hunt! We are going to search for something built by nature's architects. It was used for a home. Can you guess what we'll be searching for? (NESTS)

2. Discussion: Why is winter a good season for studying nests?

   a. Nests are not being used during the winter. In the summer, if the nest is disturbed, the bird is likely to abandon it.

   b. Nests are easier to spot in the winter when the leaves are off the trees and shrubs.

What would be a likely place to find a nest? (trees, shrubs)

What other animals besides birds build nests? (squirrels)

3. Set boundaries and time limit for children to search for bird nests.

4. Distribute Bird Nest Investigation Sheets. Explain. Have students do investigation sheets independently in their groups.

BIRD NEST INVESTIGATION

1. Where did you find the nest?

   tree_____

   bush_____

   ground_____

   elsewhere_____

2. If it was in a tree or bush, how high off the ground was it?_____

   Do you know the name of the tree or bush?

   _____

7. Of what materials is the lining made?

8. Was there anything unusual about the nest that would make it invisible to a casual glance, especially in the summer?

9. What bird do you think built the nest

3. Did the nest have some arrangement to protect it from the rain and weather during the summer?

4. Measure the nest:

   Inside width_____

   Outside width_____

   Depth_____

5. What is the shape of the nest?

   cup_____ flaring_____

   basket_____ straight_____

   pocket_____ other_____

6. What materials compose the outside of the nest?

7. How are they held together?

   woven_____ other_____

   mud_____

MYTHS AND LEGENDS

Reference source:
Myths and Legends of Flowers, Trees and Plants
by Charles Skinner (Springfield 716.29 s61m)

PINE - p. 217

The Chinese regard the pine as embleming friendship in adversity, because of its quality of enduring cold without losing its summer aspect. The tree takes its name from pinus, a raft, because the wood, being easy to cut, was employed for the boats and floats of primitive men. Hence the Greeks held it sacred to the sea god.

In the German, tradition, the pine bore children, and every hole and knot in the trunk is the point from which a wood spirit escaped into the outer world.

Pine cones are eaten by Indians, and were used as food by the Romans also, who held that they imparted strength. The pine was esteemed by our Puritan fathers, for when they landed at dismal Plymouth, it was the only green thing they saw; hence they took it as a device, stamping it upon their pine shillings and other coinage, and imposing it on the state seal of Massachusetts.

VIOLETS - Indian symbol for courage, love, and devotion.

WILLOW - p. 296

The sisters of Phaeton,(felled from the sun chariot) wailing his death when he fell, were changed into willows, and the long green streamers they put forth were as cascades of tears. The tree has been fond of dampness ever since. The association of the willow with death is denoted also in the custom of planting it in cemetaries - a custom inaugurated by the Chinese thousands of years ago. Sprays of willow are strewn on coffins in China, for, being of long life, it is a reminder of immortality.

The willow bears a curse, being planted by the devil in order to lure people to suicide

by the peculiar restful swinging of its branches.

The English hold that the willow has virtues on Palm Sunday when used as a substitute for Palm.

BIRCH - p. 63

The birch, praised as lodge and canoe, used as plate, pail, basket, and cloak, was also paper for the books of Numa Pompilius, written seven hundred years before Christ. The fasces of the Roman lictors - bundles of rods with battle axes in the center - were of birch wood, and its expression of authority lingers with us through the school and the schoolboy, smarting from it, found surcease from sorrow in nibbling at the black birch's spicy bark. It is a graceful tree.

LAUREL -

However it came by its symbolry, the laurel, or sweet bay, was prized by the Greeks as an averter of ill, and hung over their doors to keep off lightning. From a token of safety, it became a badge of victory.

If laurel were put under a rhymester's pillow, they made him a poet, and if he read his verses in a university, he was crowned with the leaves and berries - so we have the word baccalaureate, which means laurel berry; and as the student was supposed to keep so closely to his books that he had no thought for matrimony, the derivative word bachelor came to be applied to an unmarried man.

While standing under a bay tree, one was safe against wizards, and the berries kept off various diseases. At least Nero believed this was so, for during a pestilence, he retired to Laurentium so that he might save his precious health by breathing air that the laurels had purified.

SNOW ACTIVITIES

1. SNOW COVER
2. HEAT ABSORPTION AND SNOW
3. SNOW PROFILE
4. MEASURING SNOWFALLS
5. SNOW AND AIR POLLUTION
6. SNOWFLAKES

8

SNOW COVER

MATERIALS NEEDED:

snow
thermometer

PROBLEM:

Are there any advantages to a deep snow cover?

PROCEDURE:

1. Locate a fairly deep snow covered area.

2. Compare the temperature of the air above the snow and the temperature at ground level under the snow.

3. Discussion:

   a. Why do you suppose there is a difference in temperature?

   b. How could animals use this to their advantage in the winter?

   c. If you needed to seek shelter for survival from the winter cold, would a snow shelter be a good place?

   d. What people live in snow huts on their winter hunting trips?

8

HEAT ABSORPTION AND SNOW

MATERIALS NEEDED:

swatches of assorted colored construction paper
or material
snow

PROCEDURE:

1. Place swatches of assorted colors on surface of snow.

2. Observe after a few hours of sunlight.

3. Discussion:

   a. What have we learned from this investigation?

   b. What color clothes are best in cold weather? in hot weather?

   c. How could we use this information for survival?

   d. How could this information be helpful to industries such as builders and clothiers?

SNOW PROFILE

MATERIALS NEEDED:

section of snow
thermometer
digging tool
magnifier

PROCEDURE:

1. Cut an oblong or square section of snow. Try to get down as deep as possible.

2. Carefully lift this block up and place it on a flat surface for observation.

3. Study the snow:

   a. Are there any noticeable differences? texture? density? color?

   b. What could be the reason for this?

   c. Check the temperature at different levels of the block of snow.

4. Do snow profiles in different areas - forest, field, on a slope, near water.

MEASURING SNOWFALLS

MATERIALS NEEDED:

snowfall
container having area of one square foot

PROBLEM:

1. How much water does snow yield?

2. Does every snowfall yield the same amount of water?

PROCEDURE:

1. At the beginning of a snowfall, place a container having an area of one square foot outdoors in the open, but where it will not be disturbed.

2. As soon as possible after the snowfall ends, measure the depth of the snow collected.

3. Compute the volume:

   Length x Width x Depth = _____ cu. in. of water
   12" x 12" x _____ = _____ cu. in. of water

4. Repeat procedure for different snowfalls. Compare water yields.

SNOW AND AIR POLLUTION

MATERIALS NEEDED:

falling snow
clean white pan

PROCEDURE:

1. Collect falling snow in a clean white pan for about one hour.
2. Observe the snow.
   a. Does it look clean?
3. Melt the snow. Observe the water formed.
   a. Are there any dirt particles in the water?
   b. Where did they come from?
4. Do the same observation with a rain sample.

DISCUSSION:

1. How do dirt particles get in the air? (Natural causes and man-made causes)
2. How can we control the air pollution caused by man? (automobiles, industry, open burning)
3. Do you think we should limit automobile traffic in Forest Park?

SNOWFLAKES

MATERIALS NEEDED:

For each student:

snowflakes
black card
magnifier
paper and pencil

PROBLEM: are snowflakes all akike?

PROCEDURE: Outdoor activity

1. During a snowfall, collect several snowflakes on cold black cards.
2. Quickly examine them with the magnifier.
3. Sketch some of the shapes observed.
4. Compare with other children's sketches.

CLASSROOM ACTIVITY:

1. Fold and cut paper to duplicate snowflake shapes observed outdoors.

TEACHER INFORMATIONAL MATERIAL

I. BIRDS OF FOREST PARK

- A. Permanent Residents
- B. Early Arrival Summer Residents
- C. Later Arrival Summer Residents
- D. Winter Residents in order of Fall Arrival
- E. Bird Songs

II. ROCKS OF FOREST PARK

- A. Kinds of Rocks
- B. Rock Differences - Color, Hardness
- C. Investigations
  - 1. Freezing
  - 2. Temperature
- D. Land Forms

PERMANENT RESIDENTS

Sparrow Hawk (Falco sparvergius) - Kestrel-Smallest hawk, brightly colored

Great horned owl (Bubo virginianus) - Largest, eared owl

Barred owl (Strix varia) - Brown eyes, barred breast, streaked belly, eight-hooter

Saw-whet owl (Aegolius acadica) - Smallest owl, earless, chocolate brown, white eyebrows

Screech owl (Otus asio) - Smallest eared owl, two color phases

Eastern crow (Corvus brachyrhynchos) - Largest of all black birds, chicken size

Ring-necked pheasant (Phasianua colchicus) - Bird of field and shrubs, prefers running to flying, long pointed tail

Ruffed grouse (Bonasa umbellus) - Deep woods, explosive flight, fan tail, rufous or gray, chicken-like

Blue jay (Cyanocitta cristata) - Robin sized, blue above, whitish below, white on wings and tail, crested

Starling (Sturnus vulgaris) - Short-tailed black bird, triangular appearance in flight, iridescent, glossed with purple and green. Winter: heavily speckled with bright dots. Spring: bright yellow bill. Around lawns

Mallard (Anas plytyrhynchos) - Iridescent head, ruddy breast, gray.

Black duck (Anas rubripes) - Dark, white wing linings in flight

Rock dove (Columba livia) - Just the common, domestic street pigeon

Pileated woodpecker (Hylatomus pileatus) - Largest, crow-size, conspicuous red crest, black and white, not checkered, bird of the big, deep woods

Hairy woodpecker (Dendrocopus) - White back, black and white checkered wings, white under-parts, male has red nape, bill is equal to depth of head

Downy woodpecker (Dendrocopus pubescens) - Identical to Hairy but smaller. Small Hairy might look like large Downy except bill is one half depth of head

Goldfinch (Spinus tristis) - Yellow body, black wings and cap

PERMANENT RESIDENTS (cont.)

White breasted nuthatch (Sitta carolinensis) - Blue-gray back, black cap, beady black eyes in a white cheek, white underparts, nasal "Yank, Yank", upside-down bird

English sparrow (Passer domesticus) - The street sparrow, black throat, white cheeks, chestnut nape

Black-capped chickadee (Penthesthes atricapillus) - Black cap, black bib, white cheeks, whistles his name or "Phee-bee", acrobatic

Cardinal (Richmondena cardinalis) - Only all red bird with a crest

Purple finch (Carpodacus purpureus) - Sparrow-size, wine purple or strawberry

EARLY ARRIVAL SUMMER RESIDENTS IN THE ORDER OF THEIR ARRIVAL

IN THE SPRINGFIELD AREA - FIRST OF MARCH TO MID-APRIL

Woodcock (Philohela minor) - Warm brown with a "dead-leaf pattern", extremely long bill

Bluebird (Sialis sialis) - Blue back, red breast, white abdomen

Wood duck (Aix sponsa) - Most highly colored

Song sparrow(Melospiza melodia) - Streaked breast with large central spot

Common grackle (Quiscalus versicolor) - Larger than robin, long keel-shaped tail, iridescent purple/blue/green head and neck, bronze colored back, song sounds like squeak of a rusty gate hinge. Likes wet feet.

Robin (Turdus migratorius) - Gray back, darker head and tail, red breast and sides, white abdomen, white speckled chin and throat

Redwing (Agelaius phoeniceus) - Male: all black, robin size, red shoulder patch edged in yellow. Female: heavily streaked dark brown. In swamps

Sharp-shinned hawk (Accipiter striatus) - Smaller than crow, notched or square tail

Mourning dove (Zenaida macroura) - Many winter here; small, slim, pigeon-like, pointed diamond-shaped tail, white tipped; mournful cooing song - inhale, "aaah", exhale, three "coos"

Killdeer (Charadrius vociferus) - Two black breast bands, brown back, white underparts, found in plowed fields and pasture lands

Great blue heron (Ardea herodias) - About four feet tall, blue-gray

Red-shouldered hawk (Buteo lineatus) - Narrow, white tail bands

Meadow lark (Sturnella magna) - Bright yellow breast crossed by black "V", conspicuous white patch on each side of short, wide tail

Hermit thrush (Hylocihla guttata) - Brown back, rusty tail, spotted breast, snaps tail up then lets it sag slowly

Osprey (Pandion haliaetus) - Very light underneath, all white belly, black wrists

Cooper's hawk (Accipter cooperi) - Crow size, rounded tail

Flicker (Colaptes auratus) - Brown back, conspicuous white rump patch, ant-eater, on the ground most of the time, both sexes have red nape, black crescent across chest, yellow under wings, male has black moustache

EARLY ARRIVAL SUMMER RESIDENTS (cont.)

Kingfisher (Megaceryle alcyon) - Big-headed, big-billed, blue-gray above and a ragged crest. Male one, and female two, broad breast bands

Pied-billed grebe (Podilymbus podiceps) - Chicken-billed diver

Cowbird (Molothrus ater) - Black with brown head. Female, gray. Parasitic

Bittern (Botaurus lentigenosus) - Brown, streaked, points bill skyward

Phoebe (Sayornia phoebe) - Dark gray back, lighter underparts, no wing bars, tail wagger, likes bridges and out-buildings

Black-crowned night heron (Nycticorax) - Only heron black-backed and gray or white below.

Bank swallow (Iridoprocne bicolor) - Iridescent blue-green back, clear white underparts, around water

Swamp sparrow (Melospiza georgiana) - Rusty cap, gray plain breast, whitish throat

Chipping sparrow (Spizella passerina) - Small, rusty cap, white eyebrow stripe

Spotted sandpiper (Actitis macularia) - Teeters, only spotted breasted sandpiper

Towhee (Pipilo erythrophthalmus) - Head, chest, neck and upper parts black, sides and flanks rufous, white wing and tail pattern

Solitary warbler (Dendroica virens) - Yellow face patch, black throat, white underparts

House wren (Troglodytes aedon) - Brown, energetic, cocks tail over back, bubbly song, found in orchards, farmyards, around dwellings

Broad-winged hawk (Buteo platypterus) - Wide, white tail bands

Brown thrasher (Toxostoma rufum) - Yellow eyes, rufous red above, heavily streaked below white wing bars, decurved bill, long tail

Chimney swift (Chaetura pelagica) - The flying cigar, sooty colored, scimitar wings, never perches, chittering notes

Black and white warbler (Mniotilta varia) - A zebra-like creeper, white stripe through black crown

TRANSIENTS IN THE ORDER OF THEIR SPRING ARRIVAL

Red-tailed hawk (Buteo jamaicensis) - Light chest, streaked belly

Fox sparrow (Passerella ilica) - Large, fox red, rufous tail, heavily striped breast

Pintail (Anas acuta)-White breasted, needly pointed tails

Canada Goose (Branta canadensis) - Gray-brown, black head and neck or "stocking", white cheek patch

Ruby-crowned kinglet (Regulus calendula) - Very small, nervous, olive gray back, without conspicuous crown

Myrtle warbler (Dendroica coronata) - Bright yellow rump, male in Spring: blue-gray above, white below, black breast and sides, yellow on crown and in front of wings

White-throated sparrow (Zonatrichia albicollis) - Striped crown white throat, yellow lores

Solitary vireo (Vireo soliterius) - White wing bars, blue-gray head, white eye ring, snowy white throat.

Solitary sandpiper (Tringa solitaria) - Dark, flashy white sides and flank in flight

Parula warbler (Parula americana) - The only bluish warbler with yellow throat and breast, two white wing bars. Male: dark russet band across chest

Black-poll warbler (Dendroica striata) - A striped gray warbler with solid black cap, chickadee-like

Magnolia warbler (Dendroica magnolia) - Used to be called "Black and yellow warbler"; large white patches on wing and tail, yellow underparts with heavy black striping

Wilson's warbler (Wilsonis pusilla) - A yellow warbler with a round black cap

Least sandpiper (Erolia minutilla) - Smallest

WINTER RESIDENTS IN THE ORDER OF THEIR FALL ARRIVAL

Bald eagle (Haliaeetus leucocephalus) - White head and white tail

Herring Gull (Larus argentatus) - First winter: uniform dark brown. Second winter: lighter, streaked brown. Third year adult: white, gray mantle, black wing tips.

Brown creeper (Certhia familiaris) - Just that! Looks like a mouse creeping up a tree. Streaked brown upper parts, white underparts, decurved bill

Slate-colored junco (Junco hyemalis) - Slate gray upper parts, white outer tail feathers

Golden-crowned kinglet (Regulus satrapa) - Very small, nervous, olive gray back, male has bright orange crown, female has yellow crown, white stripe over eye.

Ring-billed gull (Larus delawarensis) - Looks like small herring gull, black ring on bill

Common merganser (Mergus merganser) - White body, black back, green-black head

Tree Sparrow (Spizella arborea) - Rusty cap, clear breast with stickpin

Snowy owl (Nyctea scandica) - Large white owl with round head, day-flying

Evening grosbeak (Hesperiphona vespertina) - Yellow, black and white wings

LATER ARRIVAL SUMMER RESIDENTS IN THE ORDER OF THEIR ARRIVAL

IN THE SPRINGFIELD AREA - MID-APRIL TO MID-MAY

Bank swallow (Riparia riparia) - Brown backed, dark band across white breast, nests in sand banks and cuts

Barn swallow (Hirundo rustico) - Iridescent blue-green back, pinkish or cinnamon below, deeply forked tail, white spots on tail

Rough-winged swallow (Stelgidopteryx ruficollis) - brown backed, dingy light underparts, nests in banks near water

Whip-poor-will (Caprimulgus vociferus) - Bird of the night and of deep woods, no white in wings, calls its name

Green heron (Burorides virescens) - Crow size, crest shows when alarmed, more blue than green, chestnut neck

Catbird (Dumatella carolinensis) - All slate gray, black cap, rufous under tail

Yellow-throat (Geothlypis trichas) - Yellow throat, black mask

Yellow warbler (Dendroica petechia - All yellow, reddish streaks on breast

Black-throated blue warbler (Dendroica coeruliscens) - Upper parts blue-gray, throat and sides black, breast and belly white, small white wing patch

Redstart (Setophaga ruticilla) - Black with white belly, red or orange patches on wing and tail

Wood thrush (Hylocichla mustelina) - Brown back, rusty head, breast and sides heavily spotted

Ovenbird (Seiurus aurocapillus) - Thrush-like warbler of the woods, brown back, streaked underparts, orange crown. "Teacher bird".

Cedar waxwing (Bombycilla cedrorum) - Smaller than robin, sleek brown bird, crested, lighter underparts, yellow band across tip of tail, red sealing wax on wing

Yellow-throated Vireo (Vireo flavifrons) - Olive-green above, white wing bars, yellow spectacles, bright yellow throat and breast

Blackburnian warbler (Dendroica fusca) - Black and white with flaming orange on crown, cheek and throat

LATER ARRIVAL SUMMER RESIDENTS (cont.)

Chestnut-sided warbler (Dendroica pensylvanica) - Yellow crown, chestnut sides

Rose-breasted grosbeak (Pheucticus ludovicianu) - Black and white with large triangular patch of rose-red on breast

Least flycatcher (Empidonax minimus) - Small, dark, gray, lighter underparts, wing bars and eye ring. Identical to Traill's, identify by song.

Baltimore oriole (Icterus galbula) - Orange bird, black head, wings and black on tail

Warbling vireo (Vireo gilvus) - Nondescript, no wing bars, breast whitish

Kingbird (Tyrannus tyrannus) - Black above, white below, white band on tip of fan-like tail, flys on wing tips, very conspicuous and pugnacious, open areas

Red-eyed Vireo (Vireo olivacius) - Olive green above, white below, no wing bars, gray cap, black-bordered white stripe over eye

Scarlet tanager (Piranga olivacea) - Scarlet with black wings and tail

Indigo bunting (Passerina Cyanea) - Blue all over

Ruby-throated hummingbird (Archilochus colubris) - Smallest bird, living jewel, long needle-like bill, blurred wing beats, metallic green above, white below, male has ruby red throat, squeaks. Do not confuse with Hawk Moth!

Nighthawk (Chordeiles minor) - Gray bird, long slit wings, flies erratically over cities at dusk, watch for its diving, large white wing patch

Veery (Hylocichla fuscescons) - Uniformly rusty or tawny, leasf spotted breast

Great crested flycatcher (Myiarchus crinitus) - Large, rufous tail, gray throat and breast, yellow abdomen, likes woodlands

Wood pewee (Contopus virens) - Wing bars, no eye wing, likes open woods.

BIRD SONGS

Arranged, as nearly as possible, according to arrival dates in the Springfield, Massachusetts area with permanent residents, of course, leading the list.

The following birds appear to sing their own names:

Bob - white or Quail
Blue jay - Jay, jay, jay!! or Thief, thief, thief!!
Also has a pump handle call
Imitates Cooper's, Red - shouldered and
Red - tailed hawks.
Chickadee - Also a clearly whistled "fee - bee" or
"fee - bee - ee"
Killdeer - Kill - dee
Flicker - A loud, fast flicka, flicka, flicka, flicka
Phoebe - A short, emphatic phoe - be or fi - bree -
not whistled like the Chickadee
Whip-poor-will
Bobolink - Bobolink, bobolink, spink, spank, spink
Yellow-billed cuckoo - Ka ka ka ka ka ka ka ka ka ka
Kow kow kowp kowp kowp kowp
Retarded toward the end
Black-billed cuckoo - Cu cu cu cucucu cucucu cucucu
cucucu (in grouped rhythm)
Wood peewee - A plaintive whistle - pee-a-wee
Veery - A downward spiralling song - vee-ur veer
veer veer
"oh, dearie, dearie; dare we, dare we?"
"Deer's ears, ears, ears"

These birds' names are descriptive of their songs:

Screech owl - A mournful whinney
Saw-whet owl - One of its calls sounds like someone
filing a saw.
Mourning dove - A hollow, mournful ooah, cooo cooo cooo
Chipping sparrow - A series of fast chips or trills
all on one pitch
Grasshopper sparrow - An insect-like, buzzing song
Warbling vireo - A warbled "Iggley pigelly wiggely pig"
or "If I could see one, I would seize
one and would squeeze one til it
squirts"
Mockingbird - Imitates many other neighborhood birds.

BIRD SONGS (cont.)

And finally, the bird songs to which we attribute certain phrases or sounds:

Sparrow hawk - Killy killy killy killy
Barred owl - (eight hooter) Who cooks for you, who cooks for you-all? or Oh, who are you, oh, who are you-all?
Crow - A loud caw
Goldfinch - A canary-like song ending with a note of inquiry - per-chic'-o-ree, or Potato chips!
White-breasted nuthatch - A nasal yank yank yank
Bluebird - Cheer cheerful charmer
Fox sparrow - Well, my dear, why did you take it? or All we have is some near beer; will you take it?
Song sparrow - Hip, hip hip, hurray boys, spring is here again or Maids, maids, maids put on the tea kettle-ettle-ettle
Common grackle - Sounds like the squeak of a rusty hinge
Robin - Cheerup - cheerily cheerup - cheerup - cheerup - cheerily
Red-winged blackbird - O-ka-lee or Conk-a-ree or O-gurgle-lee
Meadow lark - Spring o' the year or Its sweet to me
Hermit thrush - Oh, holy, holy - ah, purity, purity - all, sweetly, sweetly
Kingfisher - A loud, high rattle
Cowbird - Sweet sue
Bittern - Plunk-a-lunk or Plum pudd'n
At a distance, only one syllable is heard which sounds like a mallet driving a stake into the mud.
Swamp sparrow - Similar to Chipping sparrow's song but slower, sweeter, and stronger
Rufous-sided towheee - Drink your tea-ee-ee-ee and Chewink
Black-throated green warbler - See, see, see sue, see
Brown thrasher - The bird that likes its own song so well, it repeats every phrase twice:

Hurry up, hurry up; plow it, plow it! Harrow it, harrow it; drop it, drop it; cover it up, cover it up; I'll pull it up, pull it up. or

Come here, come here - do you see her - she's hiding - she's pretty, teacher's pet - right here, right here - see her - hear me - she's running - catch her, catch her. or

Croquet, croquet
Hit it, hit it
Come to me, come to me,
Tight it, tight it,
You're out, you're out. or
whatever else it might sound like to you.

Black and white warbler - weesee, weesee, weesee, weesee, weesee, weesee, weesee, (seven times)

White-throated sparrow - Poor Sam Peabody - Peabody - Peabody or Pure, sweet Canada - Canada - Canada or Oooh, see me - way ay ay, way ay ay, way ay ay

Nashville Warbler - Seebit, seebit, seebit, seebit , titititititititi - First part like Black and white warbler, last part like Chipping sparrow

Northern Yellow-throat - Witch-ity, witch-ity, witch-ity, witch

Yellow Warbler - Sweet, sweet, sweet, sweet, sweeter, sweetest or Sweet, sweet, sweet, sweet, I am so sweet

Black-throated blue warbler - Trees, trees, if you please or I am so la-zy

Wood thrush - Would you live with me - away high in a tree - I'll come right down and see

Ovenbird - Teacher- teacher - teacher - teacher - teacher - teacher

Yellow-throated vireo - "Three - eight"

Prairie warbler - Sounds like a mouse with a toothache

Chestnut-sided warbler - I wish to see Miss Beecher or Please, please, please ta meetcha

Rose-breasted grosbeak - Cheerio Charlie, How's Mary, Care to carry one to Harry?

Least flycatcher - Che-bec, che-bec

Baltimore oriole - Here, here, come right here, dear or Here, dear, come right here and see what I wear or Ha ha, I'm prettier than you are, I'm prettier than you are.

BIRD SONGS (cont.)

White-eyed vireo - Drink your near beer or Whip Tom Kelly
or Who are you now? or Get out, beat it.
Red-eyed vireo - Do you see it - do you hear it - do you
believe it? or Look up, way up, tree top,
see it, I made it
Scarlet tanager - Sounds like a Robin with a sore throat
Indigo bunting - Sweet, sweet - where, where - here, here -
see it, see it
Night hawk - Beans - beans
Crested flycatcher - Wheeeep - wheeeep!
Traill's flycatcher - Wee-be'-o
Olive-backed thrush - Oh, ah, curdle, wheedle, sweeter
Olive-sided flycatcher - Hic - three beers or Three cheers
or come right here, come right here.
Carolina wren - Cheer, cheer, cheer - service, service,
service or Reach you, reach you, reach you
or Tea kettle, tea kettle, tea kettle, tea
Cardinal - One call sounds like a man whistling for his dog
Whoit - whoit - whoit - whoit
What cheer, what cheer, what cheer
Pretty bird, pretty bird, pretty bird
Hurry home, hurry home, hurry home

MINERALS

1. Each mineral has a unique form of its own called a crystal.

2. QUARTZ, SILICA, FELDSPAR, and DIAMOND are all different kinds of minerals.

3. Rocks are formed from minerals.

4. Mineralogists are men who study minerals.

5. Minerals which rocks supply to soil:

NITRATES	CALCIUM
PHOSPHATES	MAGNESIUM
POTASH	SULFUR

KINDS OF ROCKS

IGNEOUS: formed from liquid magma fire rocks
granite - common igneous
pumice - from lava rock, has air pockets, floats
obsidian - hard, shiny, usually black

SEDIMENTARY: sediment - bits of sand, soil, clay, twigs, loose rock
built under pressure of water

sandstone - bits of sand cemented together within layers of sediment.

limestone - tiny shells pressed together
Even limestone found far from the ocean began in the sea. (oceans give way to land)

shale - mud, silt, clay pressed together - fossils found in shale.

conglomerate - coarse form fine rocks hold pebbles together.

KINDS OF ROCKS

METAMORPHIC: "CHANGED FORM"

Igneous to Metamorphic:

1. granite to gneiss (nīs)
   mineral grains crushed into bands of light and dark minerals.

Sedimentary to Metamorphic:

1. limestone to marble -
   heat melts limestone, hardens, takes on crystal form.

2. sandstone to quartzite -
   small grains disappear from sandstone. All that is left is a solid mass of quartz, used to make glass sandpaper.

3. shale to slate -
   heat and pressure changes it.
   some blackboards made of slate.

ROCK DIFFERENCES

MATERIALS NEEDED:

variety of rocks, pennies, nails, knives

PROCEDURE:

Examine rocks

Answer questions:

1. In what ways are they similar?
2. In what ways are they different?
3. What is their color?

ROCK DIFFERENCES (cont.)

4. Is the color the same throughout, or is it varied?

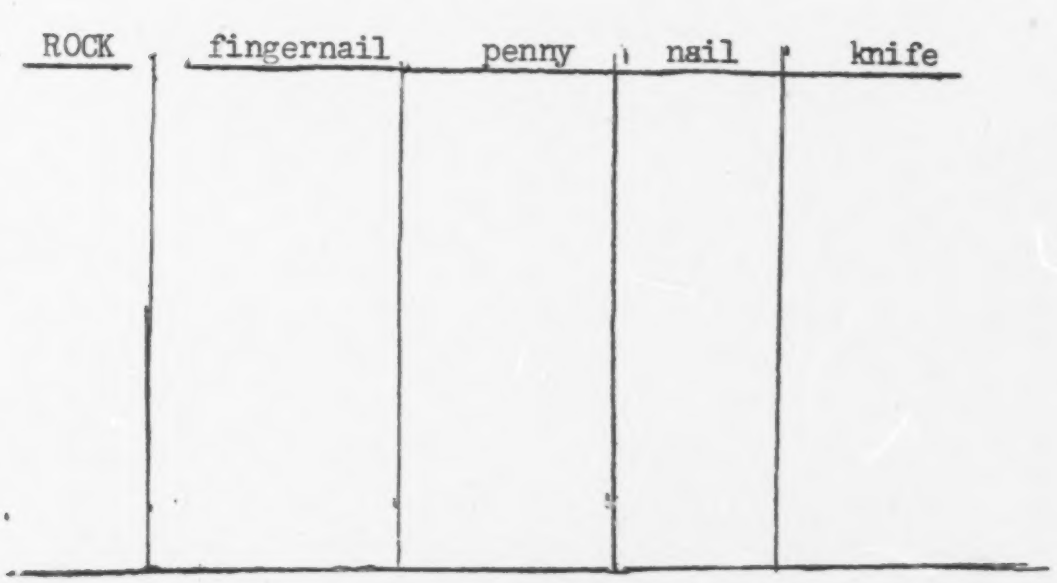
5. Can you observe the individual particles, or are they not visible individually?

6. Can they all be scratched by a knife or a nail?

7. Can the knife be scratched by the rock?

FOLLOW - UP:

SET UP SCALE OF HARDNESS:



ROCK INVESTIGATIONS.

I. FREEZING OF WATER

MATERIALS NEEDED:

thermometers
rocks in sunny place
rocks in shady place

INVESTIGATIONS OF ROCKS

I. Freezing of water

MATERIALS NEEDED:

empty can, top removed
freezer

PROCEDURE:

Place can filled with water in a freezer.
(outdoors on a very cold day)

FOLLOW - UP:

As the water becomes ice, what happens to the room it takes up?

What happens when water goes into a crack in a rock and freezes?

II. Temperature of rocks

MATERIALS NEEDED:

thermometers
rocks in sunny place
rocks in shady place

PROCEDURE:

Place thermometer reading side down on the rock.
Take readings. (not exposed to sun)

FOLLOW - UP:

How do the temperatures differ?

III. Test for limestone

MATERIALS NEEDED:

dropper bottle
lemon juice or vinegar
limestone
variety of rocks
chalk
shells
wall plaster
plaster
bicarbonate of soda

PROCEDURE:

Squeeze a few drops of acid onto a rock surface. (select a surface that is not polished.) Do you perceive any unusual reaction? A bubbling reaction indicates the rock is composed entirely, or in part, of limestone.

Test other materials.

Test other rocks.

FOLLOW - UP:

Did you get any reaction?

Is the reaction similar to that produced by limestone?

Could we infer that the material of which these items are composed is similar?

LAND FORMS

1. HILL - a raised part of the earth's surface

2. VALLEY- low land between hills or mountains
   Most large valleys have rivers running
   thruogh them.

3. SLOPE - any line, surface, or land that goes up
   or down from a level

4. GLACIAL MORAIN - rocks deposited by a moving glacier

SOILS

1. Where does soil come from? Soil comes from rock which over a long period of time has undergone the process of disintegration called weathering.

2. TWO TYPES:

   A. TRANSPORTED - carrying from one place to another (varying sizes)

   B. RESIDUAL - produced on site of parent bed-rock. (relatively of uniform particle size)

3. What are common rocks which are responsible for our soils?

PRIMARY	SECONDARY
QUARTZ	CALCITE (LIMESTONE)
MICROCLINE	DOLOMITE
FELDSPAR	SERPENTINE
MICA	HEMATITE
HORNBLENDE	LIMONITE
APATITE	

4. Soils vary in the proportion of weathered mineral rock particles
   Silt and sand = clay
   Organic materials = humus
   Rich soil = loam

E.C.O.S. GRADE SIX CURRICULUM

INDEX

PAGE	
1.	In School Program
3.	Pre - Ecos: "Lost on the Moon"
5.	Worksheet A Sample
6.	Scoring Key B
7.	At the Park Program
9.	At the Park - Afternoon Activity
10.	Post - Ecos Program Suggested Follow-Up Activities for Classroom

GRADE SIX E.C.O.S. CURRICULUM

I. PRE - E.C.O.S. PROGRAM

A. "Lost on the Moon" A Decision Making Problem

B. Problem Sheet A

C. Scoring Key B

D. In School Program

E. Suggested Follow - Up Activities

II. E.C.O.S. PROGRAM

A. Morning Survival Activity

B. Afternoon Correlating Activity

III. POST E.C.O.S. ACTIVITIES

PRE - E.C.O.S. GRADE 6

IN SCHOOL PROGRAM

MATERIALS NEEDED:

For each student:

1. Awareness walk "Log" (same as Grade 5 log)
2. "Lost on the Moon" worksheets A
   a. one for each child
   b. one for each group of 5 or 6

For the teacher:

1. One copy of the Log
2. "Lost on the Moon"
   a. Procedure
   b. Worksheet A
   c. Answer key

IN THE CLASSROOM

I. Introduce yourself and the E.C.O.S. program.

II. Introduce "Lost on the Moon" activity.

PROCEDURE: sheet attached

III. After "Lost on the Moon" activity, tell the children they had to make use of their resources on their moon walk. Now they will see how man has made use of his resources in the school community.

A. Introduce the log - go over it orally.

B. Take the children on an awareness walk.

C. Once back at the classroom, fill out the log.

IN SCHOOL PROGRAM (cont.)

IV. Then tell the children that when they come to the park, they will have an exercise in survival. Be sure to tell them to wear old clothes and see that they are dressed for the weather.

PRE - E.C.O.S. GRADE 6

LOST ON THE MOON:

A DECISION MAKING PROBLEM*

PURPOSE:

To train for survival using existing resources and potentials of working as a group, to make decisions by consensus

PROCEDURE:

1. Divide the class into groups of five or six.

2. Distribute problem sheet A to every student.

3. Briefly introduce the problem without going into details of the exercise.

4. Read the instructions aloud. Instruct each student to work independently, ranking each item in order of its importance and recording the ranking on problem sheet A. As students finish, have them turn answer sheet over on desk. (Fifteen minutes)

5. When your craft crashed on the moon, you were not alone but with others. Pass out one problem sheet A for each group and give each group a number. Have each group pick out a recorder to record the group answers.

6. Then ask each group to complete one ranking representing the decision of the whole group. Emphasize that decisions are to be based as far as possible on logic and fact rather than on any personal preference and should represent common agreement among group members rather than a simple majority vote. (Give group thirty minutes)

7. When groups finish, make chart on board of group rankings.

LOST ON THE MOON:

A DECISION MAKING PROBLEM* (cont.)

8. Give them answers from answer sheet on the board. (Discuss NASA's reasoning.)

9. DISCUSS:

   a. Did the group do better than any individual?

   b. Did some member have more influence than others?

   c. How did your group reach agreement?

   d. What are the advantages and disadvantages of this method?

   e. How did you feel working in the group?

*Procedure condensed from NTL (1970), Lost on the Moon: A Decision Making Problem.

LOST ON THE MOON — PROBLEM SHEET **A**

Group Number _____

You are in a space crew originally scheduled to rendezvous with a mother ship on the lighted surface of the moon. Mechanical difficulties, however, have forced your ship to crash-land at a spot some 200 miles from the rendezvous point. The rough landing damaged much of the equipment aboard. Since survival depends on reaching the mother ship, the most critical items available must be chosen for the 200 mile trip. Below are listed the 15 items left intact after landing. Your task is to rank them in terms of their importance to your crew in its attempt to reach the rendezvous point. Place number 1 by the most important item, number 2 by the second most important, and so on through number 15, the least important.

_____ Box of matches
_____ Food concentrate
_____ 50 feet of nylon rope
_____ Parachute silk
_____ Portable heating unit
_____ Two .45 calibre pistols
_____ One case dehydrated milk
_____ Two 100-pound tanks of oxygen
_____ Stellar-map (of the moon's constellation)
_____ Life raft
_____ Magnetic compass
_____ 5 gallons of water
_____ Signal flares
_____ First aid kit containing injection needles
_____ Solar-powered FM receiver transmitter

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LOST ON THE MOON - SCORING KEY B

Listed below are the correct rankings for the "Lost on the Moon" items, along with the reasons for the rankings provided by the NASA's space survival unit.

(15)	Box of Matches	Little or no use on the moon
(4)	Food concentrate	Supply daily food required
(6)	50 feet of nylon rope	Useful in tying injured, help in climbing
(8)	Parachute silk	Shelter against sun's rays
(13)	Portable heating unit	Useful only if party landed on dark side
(11)	Two .45 calibre pistols	Self-propulsion devices could be made from them
(12)	One case dehydrated milk	Food, mixed with water for drinking
(1)	Two 100-pound tanks of oxygen	Fills respiration requirement
(3)	Stellar map of the moon's constellation	One of the principal means of finding directions
(9)	Life raft	CO bottles for selfpropulsion across chasm, etc.
(14)	Magnetic compass	Probably no magnetized poles; thus useless
(2)	5 gallons of water	Replenishes loss by sweating, etc.
(10)	Signal flares	Distress call within line of sight
(7)	First-aid kit containing injection needles	Oral pills or injection medicine valuable
(5)	Solar-powered FM receiver transmitter	Distress signal transmitter, possible communication with mother ship

GRADE 6 - AT THE PARK PROGRAM

MATERIALS NEEDED:

For each group of four students:

Survival Kit containing these basics:

shelter material	rope	pan
entrenching tool	matches	coat hanger
newspaper	paper	magnifier

plus an assortment of optional items such as:

plaster spoon	can opener
toothbrush	tin can
balloon	plastic bag

For the teacher:

pocket knife

PROCEDURE:

1. Review PRE - E.C.O.S. activity of "Lost on the Moon".
   Discuss the idea of survival using a hypothetical situation such as:

   a. pioneers

   b. plane crash

   c. lost in the woods

2. Divide class into groups of about four.

3. Distribute Survival Kits and discuss contents. Tell students they are to select and use the items the group feels are necessary for survival. They may also use material from the environment. Stress the strength and importance of the groups in this activity.

4. Hike to the "Survival Area".

Set the boundaries
Have children begin their independent planning and activities.
Circulate between the groups, assisting if requested, but allowing the students to direct their own plans.

5. Follow - up Discussion:

   a. Have groups share their ideas and methods of survival.

      1. Were you satisfied with your survival experience?

      2. Would you do anything different next time?

      3. If you could take other materials with you, what would they be?

6. Return to survival area and try to restore the environment to its original condition, except for the packing of the snow.

GRADE 6 - AT THE PARK

AFTERNOON ACTIVITY

PURPOSE: to correlate resources and needs with population.

PROCEDURE:

Walk to an area of the park that illustrates how increases in population affect the use of our resources and consequently limit our freedom to use these resources.

Suggestions:

parking on roadside - no parking signs
traffic around the skatehouse
zoo
picnic groves
duck ponds

GRADE SIX

SUGGESTED FOLLOW-UP ACTIVITIES FOR CLASSROOM

I. LAND USE

Assume that you and four or five members of your class (groups of 4 or 5) are members of the City Council

The city is given 700 acres of land which is undeveloped.

The council must decide what to do with this land.

The effective date of the gift is May 1, 1972.

As members of the council, your plans for the land use must be agreed upon, or the owner will sell the land to a private corporation.

Refer to Sixth Grade Assembly program procedures.

II. USE OF LOCAL RESOURCES

Make a list of as many resources as possible found in your school community.

Types of resources:

man made	religious
natural	city services
educational	industrial
commercial	

After considering <u>all</u> of the available resources in the school community, apply the following questions:

1. Which of these resources are needed for the survival of the community?

2. Which of these resources are not necessarily needed for Survival, but help make life easier or more comfortable?

3. Which of these resources could be done away with?

III. LOG

Have the children think of the LOG whenever they take trips.

IV. ECOLOGY CLUB

Start an Ecology Club in school. If you need assistance, you may contact our Science Supervisor, Mrs. Lorraine Ide or Miss Kathleen Donnellan of the Science Department.

ENVIRONMENTAL CENTER FOR OUR SCHOOLS

INFORMATION BULLETIN

135

FOREST PARK

SPRINGFIELD, MASS.

SYMBOLS

---- FOOT TRAIL

\+ FIREPLACE

⊕ FIREPLACE AND PICNIC AREA FOR LARGE GROUPS

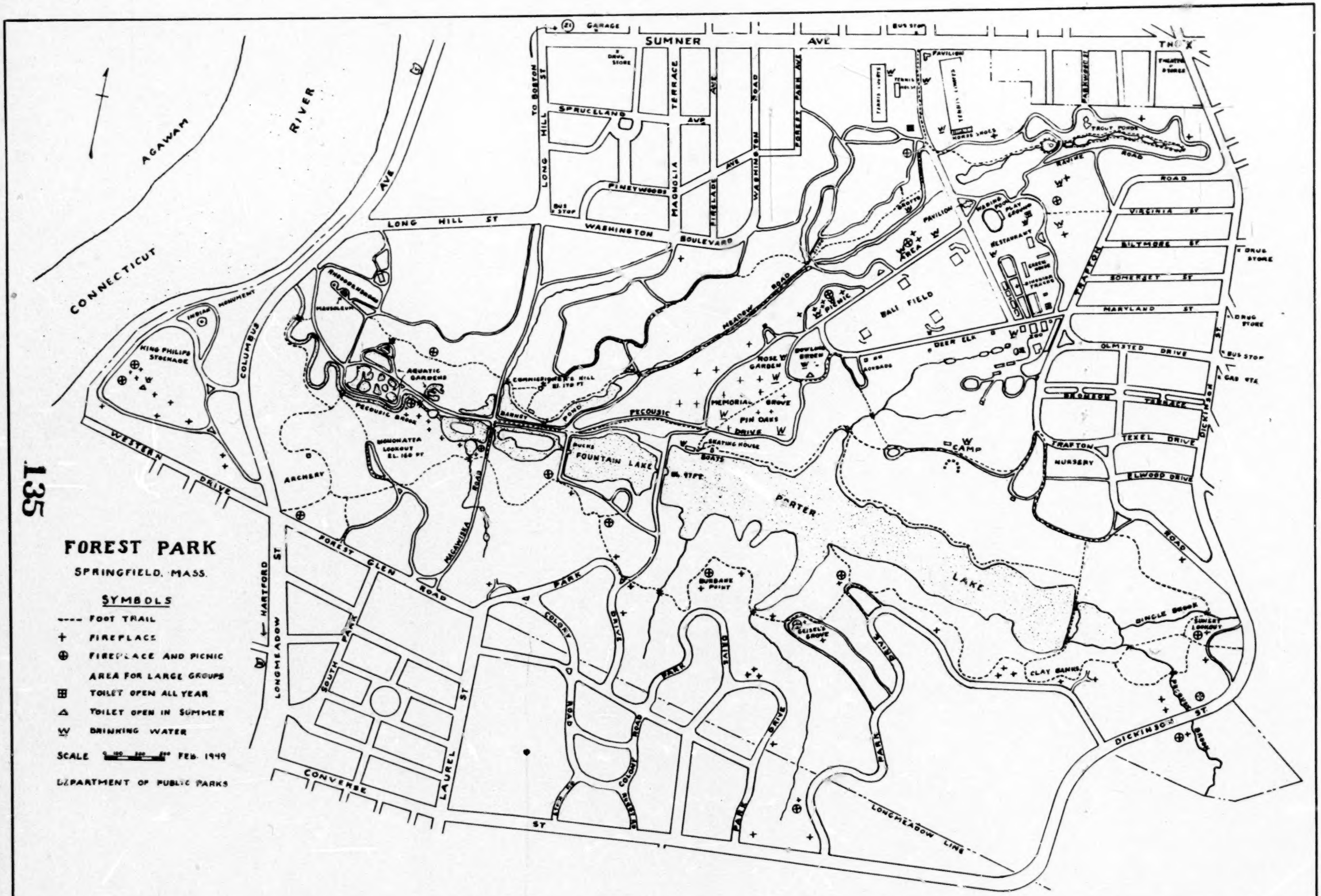
⊞ TOILET OPEN ALL YEAR

△ TOILET OPEN IN SUMMER

W DRINKING WATER

SCALE 1/8 0 1/8 1/4 MILE FEB. 1949

DEPARTMENT OF PUBLIC PARKS



FIFTH GRADE OVERVIEW

	AT SCHOOL	AT THE PARK
I. The earth is in constant change A. Survival depends on adaptation B. Living things are adapted to changes in the environment C. Processes of change are continucus II. Living things are interdependent on one another and with their environment	COMMUNITY WALK A. Preparation B. Filmstrip C. Walk D. Log E. Discussion	I. Seasonal Changes A. Activities 1. Pond 2. Field 3. Forest II. Succession

TEACHER INFORMATIONAL MATERIAL

The staff of the Environmental Center for Our Schools, ECOS, is looking forward to meeting you and your class in the near future, and hopes that you will enjoy your stay. Although the actual teaching will be done by staff members, a definite and important role has been assigned to you.

This bulletin has been prepared to tell you about the program, and your part in it. A map showing the areas of Forest Park that will be used has been included. If you have any questions regarding the program, or what you will be doing, please call Mrs. Lorraine Ide at the Central Office, or discuss them with your staff member who will visit your room before your scheduled stay at ECOS.

WHY ECOS?

Educators and ecologists, alarmed at the rapid rate at which man's environment is deteriorating, have begun to realize the necessity of educating children to appreciate and understand the role of man in his natural environment. The concepts in the Science curriculum regarding living things have assumed a great importance - they hold the key for man's survival. The problem facing educators is how best to present these concepts so that children will develop an awareness and concern for the environment in which they live, and a background to help them assume a part in the policy making of the future.

ECOS is a small beginning. Its purpose is to help children appreciate the beauties of the forest, pond and field, to have them observe the interdependence of living things in each community, and to see the vital role each member plays in maintaining an ecological balance in that community.

Some children have never had an opportunity to explore areas beyond their home and school - some have had the opportunity, but have not yet done so in this particular way. ECOS will provide the means, through an activity centered program, by which all fourth, fifth, and sixth grade children can explore and expand their knowledge of the outdoors.

ECOS should be viewed as the beginning of a continuing, vital program concerning man and his environment.

HOW YOU WILL HELP THE PROGRAM

The classroom teacher will be, at various times, an observer, a participant, and an evaluator of the ECOS program. The duties of the teacher may be grouped under three separate areas - Preparation, Program at ECOS, and Follow-up activities.

Preparation

Prior to your class visit, members of the ECOS staff will visit your classroom and introduce the program to your children. Class activities which will make ECOS more meaningful will be suggested.

At this time, a list of materials needed by your class will be given to you. Permission slips and instruction sheets for parents will be distributed to the children.

The classroom teacher will be responsible for collecting permission slips and materials, and for providing a list of his students to the ECOS staff, noting any pertinent information such as health factors or language problems. In addition, it is hoped that pre-ECOS activities suggested by the staff will be scheduled.

The teacher can help his students form positive attitudes toward the experience by reassuring timid children, restating purposes of ECOS, and reviewing science concepts which apply. It should be stressed that ECOS is an extension of the classroom, and, though location and dress will be different, rules regarding behavior and discipline will be the same as in the classroom.

AT ECOS

You will meet your class at school during the week your group is at ECOS. Attendance will be taken, and it is suggested that all children use toilets before leaving the school. Check the general health of your students at this time, excluding for the day children with undiagnosed rashes, stomach upsets, or other health problems. Have children put their names on their lunches with magic marker. Arrangements are being made at this time to provide box lunches for the children in your group who normally receive free lunch. Further information regarding this will be given to you at a later date. The bus should arrive shortly after 9:00 A.M., unless you are advised differently.

Teachers are encouraged to dress in comfortable, informal clothing suitable for the outdoors - shorts, slacks, sneakers. Be sure to anticipate cool or wet weather by bringing raincoat and hat, sweater, or coat when necessary. You will bring your own lunch.

Upon arriving at ECOS, your class will be assigned to a group for group instruction. At times, the large group will be broken into smaller units of ten children each, and you may then be called upon to supervise one of the groups in a directed activity.

During the group instruction by the staff, you will

have an opportunity to see your children in a different situation, to observe objectively behavior patterns of your group, and to note any changes that occur in the informal atmosphere of ECOS. Please observe the content and presentation of the program, keeping in mind pupil interest, safety, attitude and value changes, and ways the program could be improved.

Classroom teachers will be asked to help supervise their own class during the half hour lunch period.

Busses will leave Forest Park at approximately 2:00 P.M. Schools on single session will be dismissed so that they can meet their regular school schedule.

FOLLOW - UP ACTIVITIES

Some follow-up activities will be suggested by the staff. If you would like help in carrying out these activities, Mrs. Ide or Miss Donellan will be able to assist you. The staff is hopeful that you will think of other ways to use this experience in your classroom in many subject areas, and that you will share these ideas with them at a future date.

We sincerely hope that you will have an enjoyable stay, and that you will gain confidence in teaching your children about the outdoors.

SPRINGFIELD PUBLIC SCHOOLS
Springfield, Massachusetts

ENVIRONMENTAL CENTER FOR OUR SCHOOLS
E.C.O.S.

To assist the center staff in planning for your stay at the Center, we would appreciate your filling in this questionnaire and returning it one week before your scheduled session at E.C.O.S.

School _____ Week Scheduled _____

Teachers accompanying the classes: Number of children:

1. _____ _____
2. _____ _____
3. _____ _____
4. _____ _____

Aides accompanying the class:

1. _____
2. _____
3. _____

Parents accompanying the class:

1. _____ 4. _____
2. _____ 5. _____
3. _____ 6. _____

Is there any special information the Center should have about the group? _____

_____

_____

ENVIRONMENTAL CENTER FOR OUR SCHOOLS

E.C.C.S.

Teacher _____ Group _____

School _____

Accompanying parent or aide _____

	Pupil's Name	Special Recommendations Medical - Emotional	Emergency Phone Number
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Please divide your class into what you feel would be three workable groups.

Assign children their groups.

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ECOS should be viewed as the beginning of a continuing, vital program concerning man and his environment.

SPRINGFIELD PUBLIC SCHOOLS
Springfield, Massachusetts

September, 1971

PARTICIPANTS OF E.C.O.S.

PARTICIPANTS

E.C.O.S. is designed for the approximately 9,000 children in Grades four, five and six in the Parochial and Public Schools of Springfield. Each child and his teacher will spend school time at the Environmental Center for Our Schools (E.C.O.S.) located at Camp SECO in Forest Park.

E.C.O.S. participants will be transported from their home school in the morning to Forest Park and returned in time for dismissal.

FACILITIES

E.C.O.S. will use the facilities of Camp Seco at Forest Park and the Skate House at Porter Lake. The camp site has two lodges suitable for indoor activities and a large pavilion for shelter. The Skate House at Porter Lake is large enough to accomodate the entire group. It has two fire places, running water and toilet facilities. In addition, the 745 acres of Forest Park will become the classroom. Forest Park contains a treasure of all types of natural environments.

STAFF

There will be seven permanent staff members who are former classroom teachers interested in environmental education, adept at using the outdoors as a teaching tool, and skilled in the role of the teacher as a guide in helping children discover.

The staff will be assisted by the classroom teachers of the participants, student teachers, and teacher aides.

LUNCH

Children will need to bring bag lunches every day clearly marked with their full name and school. The School Lunch Department will supply bag lunches at thirty cents per day if you wish. Lunches and lunch milk can be ordered at school the Friday before your child's scheduled session at E.C.O.S.

CLOTHING

Children should wear comfortable, informal clothing suitable for the outdoors - dungarees, slacks, sweatshirts, sneakers. Since the program will be held outdoors in all kinds of weather, be sure to dress appropriately for all weather conditions.

AN INVITATION

Give in to your own spirit of adventure! Get into some old clothes (don't forget to dress for the weather,) pack a lunch and tell your child's teacher you would like to accompany the class to E.C.O.S. for a day. She'll be happy to give you all of the details. We look forward to having you join us!

The E.C.O.S. Staff

If you have any further questions, please contact the school or your your child's teacher.

To summarize this bulletin, a simple check-list has been prepared.

Have you:

1. Signed the permission slip and returned it to school?
2. Planned for a daily bag lunch clearly marked with your child's full name or made arrangements with the school for your child's lunch?
3. Planned for emergency clothing and foul weather gear for your child?

Clifford A. Phaneuf
Director E.C.O.S.

APPROVED:

Thomas J. Donahoe
Deputy Superintendent

SPRINGFIELD PUBLIC SCHOOLS
Springfield, Massachusetts

REGISTRATION AND PERMISSION FORM

FOR

ENVIRONMENTAL CENTER FOR OUR SCHOOLS

E.C.O.S.

We, the parents of _____ would like to have our child, who attends _____ School, participate in the outdoor program at the Environmental Center for Our Schools (E.C.O.S.) at Forest Park.

We agree that the School Department has observed all reasonable precautions in providing for the care and protection of our child and absolve the City of Springfield from liability for any accident or illness which might be incurred for the duration of this program.

My child is enrolled in the School Insurance Plan.

yes _____ no _____

My child has known allergies.

yes _____ no _____

Please list allergies: _____

_____

My child has special medical problems.

yes _____ no _____

Please list and describe special medical problems:

_____

_____

Parent signature _____ Date _____

Address _____ Phone _____

Emergency phone _____

Narrator's Copy

PSYCHOMETRICS INC.

Box 534 - Falmouth, Mass. 02540
Telephone (617) 548-9393

The following instructions pertain to the E.C.O.S. Student Questionnaire and will be given orally on tape cassette as will the reading of the actual questions. The role of the classroom teacher is to answer questions about mechanics of filling in the answer sheet in a straight, objective manner. She/He is NOT to become involved in any type of interpretation of object of this questionnaire or of intent of any of the questionnaire items. Before starting the tape, have children fill in the name of the school and the school code number.

* * * * * * * * * * * * *

Hello Boys and Girls. I am speaking for the teachers at the Environmental Center for Our Schools, which we call E.C.O.S. We are very interested in your ideas and feelings about your surroundings. We want to know what you think and feel about your home, your neighborhood, your city and about some things in general. Sometimes we will call these surroundings of yours your environment, because your room at home, your house, your city and your country are actually all part of your total environment.

We are now going to ask you to act as a reporter. What you will report is how you feel about your environment and what you have seen and done in your surroundings or your environment.

Please understand one thing right from the start; this is not a test. Notice we are not even going to ask you to put down your name on your answer sheet. All we ask you to write down is the name of your school (allow time to do this) and now put down the number your teacher gives you for your class number.

O.K. remember this is not a test so their are no right or wrong answers. Each of your answers should show us only how you feel or what you think about the subject in the question.

Lets begin. In part I there are 30 questions. Listen to each carefully. After I finish reading the question to you, you put an X in the box that shows how you feel about that question. So, if you think that what I've said is true, put an X in the yes box. If you feel that this question is false or that it is not how you feel about that subject, put an X in the no box. If you do not have any opinion about this question, or if you do not understand this question, put an X in the ? box. All right? Let's go. (read the questions 1-30)

In part II, I will read the question and here is what I want you to do. If you agree with the question or if the question seems true to you, it makes sense, put an X in the yes box. Then draw a circle around the number 1 if you agree slightly, draw a circle around the 2 if you agree in an average amount most of the time, draw a circle around the 3 if you agree strongly or very much with the statement. O.K.? Let's begin. (read questions 31-40)

E.C.O.S.

Student Questionnaire

PART I:

1. Have you done anything to fight pollution in your neighborhood in the past two weeks?

2. We add to pollution every time we do our family washing.

3. We add to pollution every time we start up our car.

4. In the past two months I have done something that has destroyed some part of my natural environment.

5. Almost all animals I know about can adapt their natural environment to suit their needs and wishes.

6. The only reason we have for protecting our natural environment is because trees and lakes and flowers are pretty and look nice.

7. People much realize that our natural environment must be protected for our own safety and for the actual preservation of mankind.

8. I would like to help if the kids in my neighborhood planned a clean-up day campaign.

9. I have never caused any kind of pollution anywhere.

10. If we didn't have trees, we wouldn't have any shade and things would look different, but otherwise nothing important would change.

11. Balance of nature means we must give all natural resources out equally to everybody.

12. I am only a student in school, and therefore there is nothing that I can do to improve my natural environment.

13. Ugly insects and animals are disgusting and should all be destroyed.

14. Amost all large jet planes cause some type of pollution.

15. My family will suffer in some way in the next ten years if the people of Springfield continue to treat their environment like they treat it right now.

16. I cannot change my environment in any way. It is up to the older kids and adults to improve my environment.

17. Mankind could destroy itself if people do not protect their natural environment.

18. The City of Springfield has no pollution.

19. All the bugs and the insects in Springfield should be killed off, one and for all.

20. As long as people can invent new things like furnaces and air conditioners and cars and airplanes, we really do not have to worry about our natural environment.

21. Food, a house with heat in the winter and clothes to wear are much more important to man than any problems with natural environment.

22 . I never really wondered what would happen if the water that I drink from our kitchen faucet suddenly became dirty and smelly.

23. Loud noise is a form of pollution.

24. Water pollution is not caused by people.

25. As long as the stores in the city can keep open, we never have to worry about pollution of our natural environment because we can buy whatever we need.

26. If all of the water supply in Springfield became polluted permanently, eventually everyone would have to move out of the city.

27. The three most common forms of pollution are noise, air and water pollution.

28. It is important for me to know all about my natural environment because my natural environment will always have an effect on how I live.

29. If all the trees in a woods were cut down, the soil would eventually wash away.

30. If all the bugs and insects of a woods were killed off, all the animals of that woods would be better off.

PART II:

1. I think that I can help to improve my own natural environment.

2. I believe that all people should be concerned about pollution.

3. If we do not use our natural environment wisely, we will all suffer eventually.

4. My environment covers all areas of my living from my room at home, my house, my neighborhood, my city, my country and there are things I can do now to make it better.

5. I feel that I can learn important things about my environment out of school on my own by looking and listening carefully.

6. The way that I live affects all the people around me in some way.

7. What I learn now about my surroundings, my environment, affects on what I think and what I do when I grow up.

8. If everybody in Springfield treated our environment carefully and wisely, this city would be a better place in which to live.

9. My school is not the only place to learn about my environment.

10. I have a great deal of control about what happens to me in the future.

E.C.O.S.

STUDENT RESPONSE SHEET

Name of Your School:_____ School Code Number_____

	YES	NO	?			YES	NO	?	
1.					16.				
2.					17.				
3.					18.				
4.					19.				
5.					20.				
6.					21.				
7.					22.				
8.					23.				
9.					24.				
10.					25.				
11.					26.				
12.					27.				
13.					28.				
14.					29.				
15.									

PART II:

	YES	NO	?	1	2	3		YES	NO	?	1	2	3	
1.								6.							
2.								7.							
3.								8.							
4.								9.							
5.								10.							

E.C.O.S. TEACHER QUESTIONNAIRE

Please complete the background information items below, even if you have supplied this information on other forms. Your responses will be scored by machine and kept in complete confidence. Your responses are essential for the useful analysis of this research project.

Thank You.

1. Indicate your sex.

   a. Male b. Female

2. Indicate that field that most closely relates to your primary college major.

   a. Biological Science
   b. Physical Science
   c. Mathematics
   d. Social Science
   e. Humanities
   f. Fine Arts, Performing Arts
   g. Elementary Education
   h. Other (state)_____

3. Indicate general age range at last birthday.

   a. Under 25
   b. 26 to 35
   c. 36 to 45
   d. 46 to 55
   e. 56 to 65
   f. 66 to 70

4. Indicate number of years teaching experience._____

5. Indicate number of years teaching experience at present grade level.
   _____

6. Indicate number of years teaching experience at present school.
   _____

7. Indicate number of years teaching experience in Springfield School System._____

8. On the following list, indicate the highest degree you hold.

   a. Less than four years of college work.
   b. Bachelor's Degree.
   c. Master's Degree.
   d. Doctoral Degree.

9. From what type of High School did you graduate?

   a. Public (rural)
   b. Public (urban)
   c. Catholic
   d. Independent - Private School

10. **Indicate whether you think each of the educational objectives** below really is practiced, choosing one of the first three options below (" IN PRACTICE"). Then indicate whether you think it should be emphasized or practiced, choosing one of the second three options below ("SHOULD BE"). Please answer both questions for each item.

IN PRACTICE

_____ This purpose is not emphasized.

_____ This purpose is moderately emphasized.

_____ This purpose is strongly emphasized.

SHOULD BE

This purpose should not be emphasized. _____

This purpose should be moderately emphasized. _____

This purpose should be strongly emphasized. _____

A	B	C	To help students improve their social and economic status.	D	E	F
A	B	C	To help students prepare for their role as good citizens.	D	E	F
A	B	C	To help students develop a self-image.	D	E	F
A	B	C	To help students discover that the learning process is a continuum that operates to a greater extent outside the classroom than in it.	D	E	F
A	B	C	To mold students according to the rules and expectations of society.	D	E	F
A	B	C	To orient students to the reality that they as individuals have a responsibility to themselves as well as to others.	D	E	F
A	B	C	To give students specific knowledge and academic skills.	D	E	F
A	B	C	To help develop students' characters.	D	E	F
A	B	C	To prepare students to cope effectively with the outside world.	D	E	F
A	B	C	To help students to become intellectually independent.	D	E	F
A	B	C	To help students to develop an individual personality.	D	E	F

11. How do you feel about the importance of the following teaching techniques relative to the teaching of elementary school science.

A = Detrimental
B = Unimportant
C = Somewhat Important
D = Very Important
E = Essential

A B C D E 1. The use of actual objects and plants, animals for development of students' sensory appreciation in scientific investigation.

A B C D E 2. Division of students into task teams to perform on-going investigations and experiments (like tracking weather patterns over a period of time).

A B C D E 3. The use of bulletin boards.

A B C D E 4. Use of outside speakers.

A B C D E 5. Use of complimentary experience or knowledge of your own students in class presentations.

A B C D E 6. Creation of an artificial ecological system for on-going observation (such as an aquarium or a terrarium).

A B C D E 7. Use of A-V equipment for audio-visual presentations.

A B C D E 8. Use of outdoor (on school grounds) classroom situations to emphasize and reinforce concepts.

A B C D E 9. Use of field trips to museums.

A B C D E 10. Use of field trips to an outdoor classroom site.

A B C D E 11. Use of team teaching in any form.

A B C D E 12. Use of teacher-made scientific devices to perform experiments.

A B C D E 13. Use of teacher-created combinations of objects, plants, animals to reinforce scientific concepts.

A B C D E 14. Use of the discovery method where children carry on their own investigations.

If you use any of the above techniques as a regular part of your science curriculum teaching methods, please indicate by circling the corresponding numbers here:

1 2 3 4 5 6 7 8 9 10 11 12 13 14

12. Please indicate by checking the following:

a. If you regularly innovate when teaching science i.e. you implement by technique, device, etc. any instruction that you feel is personal to your classroom or is, at least a deviation from the prescribed curriculum materials of your school:

1. Yes I Do
2. No I Don't
3. Approximate times_____
4. Approximate different innovations_____

b. How do you rate effectiveness on an average during the course of the normal methods open to you:

10% 25% 50% 60% 80% 100%

13. Please rate your school system's policies in the Elementary Science Curriculum only in the following areas:

_____There has been recent change and it is adequate.

_____More change is still needed in some areas.

_____There has been change and it has not worked out.

_____No changes need to be made at present.

_____The Status Quo is working very effectively.

A B C D E 1. Basic Text Book Materials.

A B C D E 2. The prescribed curriculum.

A B C D E 3. The daily period schedule.

A B C D E 4. The yearly schedule of units to accomplish.

A B C D E 5. Restrictive rules and regulations about subject matter and teaching methods.

A B C D E 6. In-Service orientation to total curriculum goals.

A B C D E 7. In-Service training in new teaching techniques.

A B C D E 8. Material availability.

A B C D E 9. Field trip logistics.

A B C D E 10. Availability of up-dated information and materials.

A B C D E 11. Availability of system-wide curriculum goal information.

A B C D E 12. Cross-Grade communication in terms of curriculum-continuity.